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The Harveian Oration

ON

THE DEBT OF PREVENTIVE MEDICINE TO HARVEY AND THE COLLEGE OF PHYSICIANS

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON ON OCTOBER 18TH, 1932

BY

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I am indeed very sensible, Sir, of the honour which you confer upon me in the imposition of this task, and I venture to express my grateful appreciation by offering for your consideration a brief commemoration of some of the benefactors of the College who have advanced the study and application of the preventive principles of Medicine, and of whom Harvey was the forerunner.

The facts of Harvey's life have often been recited within these walls, and are well known to you. His fame rests upon two achievements. He rendered the College of Physicians manifold services for half a century, and left it precious legacies and benefits. And by his discovery of the circulation of the blood, which Sir Thomas Browne preferred to the discovery of America, he became the founder of modern physiology. He it was who opened wide for the science of Medicine the gates of the Renaissance and revealed, like Copernicus, a new orientation of human thought. The discovery itself was twofold: that the blood throughout the living body circulated from the heart through the arteries and back to the heart again through the veins, and that this movement was propelled by the contraction of the heart. The establishment of these two simple facts ended notions, theories, and doctrines which had endured for 1,500 years.

Harvey's demonstration of the mechanism of the circulation of the blood was pregnant with vast consequences, loaded with fate, something more than an interpretation of the special function of the heart and blood vessels, more than the explanation of a mechanical act. For in the first place, following Aristotelian principles which he learned at Padua (which was more Aristotelian than the Platonic Academy at Florence attended by Linacre), Harvey arrived at his conclusion, not from books nor yet by logical deduction of known facts, but by direct observation and experiment. In his little book, one of the most wonderful little books in the history of man, he sets out, step by step, the mechanical course of events in the cardiac cycle, illustrated by his own convincing tests and experiments. Thus he applied the scientific methods of Aristotle and Roger Bacon as an example of the means of discovering the secrets of Nature. As a Vesalian anatomist he studied the anatomical morphology of the blood system in both man and animals ; as a Galenic disciple he conceived of the function of the structures he found, and devised experiments, by vivisection or otherwise, for proving the validity of his interpretations ; and he was one of the first to use physical measurement in biological inquiry.

And in the second place, Harvey is never in any doubt that an understanding of the circulation provides the only basis for the intelligent study of the function of the blood itself and of the physical nature of man, of which he claims the heart as sovereign. So long as the blood contained demons and spirits, was dual in character, and was static or tidal, and so long as the heart was a mixing-tank and heat generator rather than the propeller of a circulating fluid, there could be no new physiology. Thus, whilst he neither foresaw nor formulated the subsequent research in physiological problems, he led men to expect an abundant harvest from his seed-sowing. He also tells us that as a circulating blood carries nutriment so it carries infection and contagion, the poison of wounds, the virus of serpent bite, the infection of rabies of the dog, of syphilis, and of ague.

The New Physiology

Here, therefore, was the opening of a new epoch. Men's minds were turned intensively to problems concerning the nature of man and to fresh methods of grappling with such problems. Is it surprising that new and emergent discoveries were manifold and of vital concern? They were not designed, or even foreseen, by Harvey, yet it was by Harvey's method that they were attained, and a circulating blood was lord of their event. . . .

From these discoveries I turn to mention some of their applications in Preventive Medicine. The organized attempt to prevent disease began in England in the fourteenth century, when the nation was faced with the disaster of the Black Death, which reduced the population from four millions to two millions in a single year. From that dark day to the present there has been steady, and in recent years rapid, advance. From the sixteenth century the State itself took a hand in the business, and in our own time has secured the co-operation of the private practitioner, the research investigator, and the public medical officer. Their joint achievements have distinguished the last hundred years beyond other secular periods. I suppose that in no previous epoch in the history of mankind has there been such growth of the conception of preventive medicine and the practice of its art. It has saved millions of lives from premature death or crippling disease ; it has extended the expectation of life for every infant born ; it has, in Rudyard Kipling's phrase, " smote for us a pathway to the ends of all the earth," peopling whole tracts of the world which have formerly been decimated or deserted. In doing these things it has become a primary factor in the destiny of nations and in the future of man's life.

It is difficult to make a selection of illustrations, from what Dryden would have called " God's plenty," to prove this growth of knowledge or its applications, because of their manifold and varied character. But I will offer for your consideration three examples, and each of them shall be a descendant of the achievement of the immortal Harvey.

The Physiological Balance as a Conservation of Health

No one can consider the formidable and varied advances of modern physiology without wondering whether it is possible to weave them into a synthetic " grand purpose," as Borelli foresaw it. Apart from his specific discoveries this is what Claude Bernard did, and it was perhaps his greatest service to physiology.

> " Animals have really two environments," he said, " an external environment in which the organism is situated, and an internal environment in which the tissue elements live. . . . All the vital mechanisms of the body, varied as they are, have only one object, that of preserving constant the conditions of life in the internal environment."

This is the synthetic principle of Bernard, that all the vital functions of the body establish jointly a constant and stable internal environment for the organism which lives its life amid a variable external environment. Bernard was led to his conclusion by the constancy of the proportion of sugar in the blood as regulated by the liver, but in the last half-century we have learned of the relative constancy of the alkalinity and content of the blood (even in transfusion), of the process of respiration, of body temperature, of the nervous integration and regulation of the body, and of the control of the body

by the circulation in the blood of the endocrine secretions. Wherever we turn we find evidences of this internal constancy, maintained by respiration, circulation, the course of digestion and nutrition, the activities of the liver and kidney, the secretions of the ductless glands, and the total metabolism of the normal body. We must be reserved in attempting to assess the findings of physiology, to say what is great and what is small, but we shall be safe in accepting provisionally this supreme synthetic interpretation as among its highest gifts.

The further Claude Bernard reflected upon his deduction the more convinced he became both of its validity and of its practical application. He saw indeed in his day that health and capacity depend upon this physiological balance of the constant internal environment, surviving and moving in a variable external environment. He wanted men to understand it, to regard it, and to live by it. We now see in our day that the mastery is being attained, in rationale and in practice. In a word, we are beginning to apprehend the physiological life as the basis of health and as the foundation of Preventive Medicine. To have learned that fact is the beginning of wisdom. Claude Bernard, like Harvey and Hippocrates before him, saw that the physiological life, Nature herself, is the healer of disease and the protection against its invasion.

This conception was first put into practice in the fifth century B.C. in the Aesculapian temples, the sanatoriums of the ancient world; it was carried forward by the gymnastics of the Greeks, by the hygienic vision and education of Hellenism, by the substitution of natural aetiology for the supernatural daemonic magic and medicine of the East; it inspired the sanitation of the Roman Empire, and there, in the writings of Celsus, Pliny, and Cicero, it lay embalmed for centuries. The conservation of health in physiological balance revived in the Renaissance, and was carried from Florence to Padua, and thus to Leyden and England. We may find it in the letters of Erasmus, in More's *Utopia*, in Linacre's translation of Galen's *Preservation of Health*, scattered through Shakespeare's plays, in the writings of Sir Thomas Browne and Lord Bacon, in Sydenham's letters, in the great work on hygiene of Peter Frank the Bavarian —everywhere for the rich and scholarly. Yet it still had to be given to the great mass of the people.

It was given them by Lind in relation to nutrition; by William Cadogan for mothers and children; by Sir John Pringle in the health of the Army and public hygiene. In our own day we have been the witnesses of the labours of a group of physiologists, who have abundantly proved the validity of the constant internal environment by the new light which they have thrown upon the internal secretions, chemical and nervous regulation, and the nutrition of the body of man. They established not only our knowledge as to the basis of the conservation of health, but also the application of that knowledge to the direct prevention of disease. For the unfortunate people suffering from cretinism, goitre, diabetes, anaemia, malnutrition, deficiency disease, beriberi, osteomalacia, scurvy, and rickets—all the world over and for all races—there has been found, within our life time, the answer to their malady, the repair of the disturbance of balance in their constant internal environment, and the means by which such disturbance may be avoided in future. In a word, we now know that physical health and mental capacity depend upon a mutual contribution of nutrition, hormones, nervous regulation, and oxygenation of the circulating blood, as we also know how these factors can be made direct instruments of the prevention of disease, and thus fulfil the office of medicine, "to tune this curious harp of man's body and reduce it to harmony."

The Cause and Control of Infective Disease

As a second example of the Harveian method and spirit at work we may take the study of the cause and control of infective diseases. As we have seen, Harvey himself held that the circulating blood carried infection. No group of men followed more faithfully the teaching of Harvey and Sydenham than the physicians of the eighteenth century. By that time the circulation of the blood was fully accepted and Harvey's mode of workmanship had become part of English tradition. What was lacking was any exact knowledge of causation. In spite of that, the practical sense of the English did, in fact, achieve before the end of the eighteenth century, two significant conquests in this long list of diseases—namely, the control of scurvy and of small-pox.

The mighty movement which changed the whole situation was the advance of bacteriology. It began with surmises and conjectures in the sixteenth century. But, as we all know, it was Louis Pasteur and Robert Koch who eventually proved the case; Pasteur by his study of fermentation and viruses, and Koch by his ingenious technical methods of isolation. Only as we view at a distance their labours in the last half of the nineteenth century are we able to appreciate the revolution in the science and art of medicine which they achieved. If we reflect on the fact that in the brief period of fifteen years, from 1880 to 1895, there was discovered the bacterial cause of nine diseases—typhoid fever, tuberculosis, suppuration, glanders, cholera, diphtheria, tetanus, Malta fever, and plague; and that in the same period there was provided the initial form of protective inoculation against anthrax, rabies, diphtheria, tetanus, cholera, and typhoid—we shall understand the magnitude of the modern conquests of preventive medicine. Much had to be done, much still remains to be perfected, but here we are in an altogether new kingdom, the control by the body of infective processes.

The discovery of causal pathogenic organisms immediately led to finding them in the tissues of the affected person. In typhoid, tuberculosis of the lung, diphtheria, tetanus, and plague there arose forthwith the need for a bacteriological diagnosis as well as a clinical. The physician called in the bacteriologist, and the relation of bacteriology to clinical diagnosis became a subject of lively discussion. It stimulated inquiry into possibilities of destroying the bacilli before they entered the body, into the channels of infection (contact, "carrier," droplet infection, clothing, water, milk, etc.) and their control, into inoculation and vaccination, and into antitoxin treatment. Lord Lister's application of antiseptic principles exerted no doubt a highly beneficial effect upon surgery, but its influence was much wider, for it demonstrated a means of control of almost universal application. Dr. Snow and Dr. Budd showed that the biological examination of water supplies became a practicable test of safety; Dr. Michael Taylor of Penrith did for milk what they had done for water, and that vehicle of infection also came steadily under control; Cameron and Thorne were among the first to "incriminate" polluted shellfish of conveying the infection of typhoid, and, like water and milk, oysters, too, came first under suspicion and then under control.

Only a generation has passed since the bacterial cause of disease has been our possession. Yet there has been time to assimilate the new knowledge and correlate it with the old, to recognize that in the production and determination of disease the seed is one factor and the soil another. The study of the interaction between them has been illuminating and profoundly instructive. It has confirmed and even fortified the Hippocratic and Harveian confidence in the nature of man's body. Though we

cannot as yet assess the degree of control with which this new knowledge empowers mankind, we are not without encouragement provided by the remarkable decline in the incidence and mortality of disease.

Immunity

A third example is artificial immunity, an acquired defence of the host against harmful influences of bacterial origin, perhaps the greatest single advance in modern Preventive Medicine. It was known before Sydenham's day that an attack of measles or small-pox naturally protected the patient from further attack, and Harvey knew that the blood had protective qualities. But it is only in our own times that explanation of this property has been attempted and found. Pasteur used to say that he received part of his inspiration from Jenner and his empirical experiments in vaccination. Pasteur's chicken cholera vaccine was in fact comparable to variolation, the inoculation of an attenuated variola. Four facts formed the basis of the organized exploration which began in our own time: the natural protection provided by an attack of measles or small-pox, the attenuated virus of Jenner and Pasteur, the bactericidal defences of the blood itself, demonstrated by Lister, and the phagocytosis of Metchnikoff.

We now have at command protective inoculation against a number of diseases—for example, small-pox, anthrax, plague, cholera, typhoid, rabies, and diphtheria by attenuated virus in small-pox and rabies, and by the dead bacillus as immunizing agent in the other conditions. In all these cases the antibodies in the blood do not act alone in antagonizing the toxic invasion ; they are aided by accompanying cellular changes in the body itself. In the development of acquired immunity we see, in fact, an intensification of the defensive actions and properties possessed by the body in its natural state, which continue after the antibodies have disappeared from the blood. It is common knowledge that the principles of active immunity have now been directly applied in the treatment of already existing infective disease in the form of autogenous strains of the infecting organism, disintegrated or killed. These act by aiding the local defences of the tissues or stimulating the production of antibodies in the blood. It is indeed a confirmation and fulfilment of the Hippocratic doctrine that health and disease are both in themselves "divine," and the body is itself the healer of disease.

Thus the physician is now active in the preventive aspect of healing ; his drugs and remedies are not only prescribed for their preventive propensity, but they are specifically preventive in purpose. . . . They are not all of equal value, and some will be ineffective in insusceptible patients. But the strange thing has happened that we are the witnesses of a new approach to disease, a new birth of Medicine, *a treatment which is preventive*, undreamed of by Harvey and unavailable in this College two generations ago. We all know the results, some of them dramatic and historic throughout the world, some of them local, prosaic, and obscure, but on the whole profoundly beneficial in the reduction of the incidence and mortality of infective processes.

PREVENTIVE WORK OF THE COLLEGE OF PHYSICIANS

Such then, in brief, is a narrative of Harvey's discovery and some of the subsequent effects to which it led in the realm of Preventive Medicine, and in which the College of Physicians has played so great a part during its 400 years. It was Bacon who said, in 1605, that "it is order, pursuit, sequence, and interchange of application, which is mighty in Nature." But Linacre himself, the founder of the College, might well have written these words a hundred years earlier. For he was their embodiment, and he it was who brought back the Greek learning from Florence and Padua at the end of the fifteenth century that it might inspire English Medicine. In addition to his translations of Galen, he endowed medical lectureships at Oxford and Cambridge, and as physician to the King he prevailed upon Henry VIII in 1518 to establish the College of Physicians for the purpose of advancing medical education and standardizing the practice of medicine. In Linacre's translations and institutions, in the *Utopia* of his pupil Sir Thomas More, and in the history of this College we may seek and find the beginnings of preventive action in English medical practice.

Before the days of the existence of the Medical Department of the Privy Council in 1858, the College of Physicians was consulted frequently in regard to the practice of Preventive Medicine and the administration of public health measures by the City of London, the Privy Council, and Parliament. In 1627 it was asked to inspect the Alum Works in Aldgate, and Harvey was a member of the committee appointed to report thereon ; in 1648 the question of baths for public use was raised ; in 1693 the Lords of the Admiralty requested to be advised by the College on medical treatment of sickness in the Fleet, and subsequently for many years on distillation of water, the ventilation of ships, the victualling of ratings, and the prevention of scurvy and the control of infectious disease in the Navy ; influenza called for advice periodically from 1784, and in the same year the supervision of madhouses was placed in the hands of the College by Parliament ; and from 1831 onwards the College was consulted frequently in regard to the prevention of cholera in England and of leprosy in the Colonies and Dominions.

It is, however, the internal and designed polity of the College in respect of the pharmacopoeia, the registration of the cause of death, the plague and small-pox, and the practice and investigation of its Fellows, which has necessarily led the College of Physicians to take an historic share.

The Pharmacopoeia

In the Letters Patent constituting the College in 1518 there was included a provision consigning to four persons named by the College the duty of "the correction and government of physic and its professors (practitioners), together with the examination of all medicines, and the power of punishing offenders by fine and imprisonment." This duty, confirmed by statute in 1522, was discharged by the College for 340 years, until 1858. It was part of its internal polity, even a reason for its foundation. In 1540 the College was empowered by statute to destroy any defective drugs which their authorized representatives found as a result of their examinations. These College visitors were the forerunners of the inspectors and analysts under the Sale of Food and Drugs Act of 1875 and its successors, and this control and authorization of drugs of recognized standard has been of immense protective and constructive value to the science and practice of medicine.

In 1618 the College produced the first *Pharmacopoeia*. Subsequently nine editions were published from 1650 to 1851. The Medical Act of 1858 transferred the duty from the College to the General Medical Council.

For the first 170 years these pharmacopoeias followed the traditional custom derived from the Arabians, being an inventory of drugs used and approved for the time being. But the additions became both more scientific and more directional in 1788 and 1836. The *Pharmacopoeia* of 1836 is marked by the admission to its pages for the first time of the alkaloids, aconite, quinine, morphine, strychnine, hydrocyanic and phosphoric acids, iodine and bromine preparations, creosote, ergot, and lobelia. Thus was introduced into practical pharmacology in England that new philosophy of the art of therapeutics which is designed to control the internal forces which affect the

body or its organs injuriously by means of counteraction, neutralization, or prophylaxis.

Since the General Medical Council took over from the College, under statute, the duty of authorizing a pharmacopoeia they have produced six *British Pharmacopoeias* from 1864 to 1932. If the latest and current edition be compared with the *Pharmacopoeia* of 1836 it will be observed that *inter alia* it is characterized by two new features. There has been a substantial increase in the number of authorized prophylactic drugs, such as cod-liver oil, liver extract, salvarsan, sanocrysin, atropine, and glucose ; and it contains for the first time a new category of biological agents of a directly preventive nature, the use of which has greatly strengthened what the compilers of the reformed *Pharmacopoeia* of 1836 called "the armamentarium of the physician," particularly in respect of artificial immunity. For among these biological substances are the vaccines, antitoxins, and antibacterial serums, thyroid and parathyroid extract, insulin, adrenaline, and pituitrin, now standardized under the Therapeutic Substances Act of 1925.

Registration of Cause of Death and Nomenclature of Disease

There is a second example of the policy of the College to which brief reference should be made, and which has had still more far-reaching preventive effects. The year before Queen Victoria came to the throne Parliament passed an Act for the registration of births and deaths, a natural corollary to the Census of 1801. Births and deaths had been partially registered in the parish records of England since the days of Queen Elizabeth. But many of these church registers having been lost, the Act of 1836 was passed to make the record secular and complete, independent of religious opinion. Thus did the legislature of England, in the words of Dr. William Farr, "take the lead in advancing the health of Europe." But it was not the Act of 1836 which secured this, for it alone was insufficient. In the spring of 1837 the Registrar-General (Mr. Lister) wrote to the College of Physicians soliciting the aid of "every practising member of any branch of the medical profession" in sending to the local registrar of deaths "a written statement of the *cause* of death" of any person upon whom he was in attendance.

On May 1st Sir Henry Halford, the President, jointly with the President of the College of Surgeons (Sir Astley Cooper) and the Master of the Apothecaries (Dr. Hingeston), issued their memorable circular to the profession asking all practising medical men to enter on the death certificate the authentic cause of death. They claimed that the important object of such returns, when collated, would be more accurate knowledge (1) of the comparative prevalence of various mortal diseases in England and Wales ; (2) the localities where they prevailed ; and (3) the age, sex, and condition of life principally affected. Here, then, was a statistical method which, as Farr pointed out in his report to the Registrar-General in 1839, gave the State for the first time the necessary foundation for modern nosology and epidemiology, for treatment and for prevention.

> "Any improvement in the treatment of disease," he said, "and any addition to medical science, will tend ultimately to the diminution of human suffering. *But the registration of the causes of death is calculated to exercise a still more direct influence upon the public health.* Diseases are more easily prevented than cured, and the first step to their prevention is the discovery of their exciting causes."

For the voluntary practice thus initiated by the College the Registrar-General officially and publicly thanked the medical profession, and after a generation of experience Parliament, in 1874, made statutory provision requiring the *medical certification of the cause of death* in all cases. It is this registration of the *cause* of death by the medical practitioner which lies at the back of the application and direction to-day of public health measures for communal health.

When at the Registrar-General's request Farr undertook the task of classifying the causes of death returned by the medical profession in 1837, he was faced with the immediate necessity of an appropriate nosology. The College appointed a committee in 1857, and by 1869 the new *Nomenclature of Diseases* was ready. On March 6th Her Majesty's Treasury approved of its gratuitous distribution among 20,000 registered practitioners in the United Kingdom.

Statistical data and uniformity of nomenclature are great things, but accurate diagnosis and the correct certification of the cause of death are greater. For this is the first and most fundamental factor in any scientific form of control. It was largely because of this public-spirited contribution by the College of Physicians that the Registrar-General's reports became the basis of the application of Preventive Medicine in England and in civilized States throughout the world.

The Plague

The contribution of the College to Preventive Medicine was, however, even more direct than its polity. The plague was prevalent in England from 1348 to 1666. From the experience of Wolsey and letters from Erasmus and Sir Thomas More, we know that when the College was founded by Henry VIII there was prevalent in London the third outbreak of the sweat and the plague (which prevented the King from coming to London). In 1518 the King himself, on the advice of his physicians, had recommended the marking of plague-infected houses and preparatory arrangements for quarantine, a recommendation which became the first plague order in 1543. In 1529 the King urgently consulted his College of Physicians as to what means they advised for the prevention of this disease. The Privy Council in 1532 also on their advice ordered the issue of plague bills, the first of a long series, which were succeeded by the registration of plague deaths in parishes (1539). In 1563 the College was satisfied that there was some relation between animals and human plague, and recommended the destruction of dogs and cats.

From 1630 to 1665 the College of Physicians issued advices periodically as to the prevention of plague. It is true that many of their recommendations were derived from former practices of somewhat mediaeval character, such as the sovereign remedy of flight, the marking of infected houses and persons, the appointment of "searchers," strong-smelling fumigations, and the necessity of sanitary cleanliness. The control of animals and tainted food, the removal of "annoyances," and the speedy burial of the dead emerged from current belief that they served as sources of infection. The medical profession were by no means unanimous as to the best course to take, and Fellows of the College were not always then, as now, in complete agreement with one another.

Richard Mead did not live in the time of the plague, but owing to public alarm as to possible invasion in 1720, he was, whilst censor of the College, commissioned by the lords of the Regency to advise the Government, and in his *Discourse on the Plague* he summarized the medical knowledge of his age. He restricted the source of its contagion to infected persons, materials, and air, and his recommendations for defence have a modern touch. There was to be appointed a Council of Health entrusted with requisite powers, and responsible for ascertainment of cases and deaths by competent registrars, isolation of cases, destruction of infected goods, and disinfection of bedding and clothing. More general measures were also to receive official attention, such as sanitation, suppression of vagrancy, sanitary cordons around infected districts, and quarantine. Although the plague never again invaded England, these eighteenth century recommendations have proved the ancestors of modern methods in Europe and the East.

Excessive Spirit Drinking

A fourth example of the preventive action of the College was singular and significant. In the first half of the eighteenth century (1730–49) the number of deaths of children under 5 was 74 per cent. of the births, and this was attributed to the orgy of spirit-drinking which characterized the English people in that period, for reasons which we cannot discuss now. Smollett, Cadogan, Willan, and other physicians drew attention to the indisputable evil physical results of this excess. The results were so

disastrous that in 1725, during the presidency of Sir Hans Sloane, the College of Physicians petitioned Parliament on this subject.

As a result of this and similar petitions and appeals Parliament passed the Gin Acts of 1736, 1751, and 1752, for the suppression of gin-shops and the restriction of private retail sales. One hundred and ninety years later a somewhat similar social problem faced the nation, and the Government appointed the Liquor Control Board (1915-18). The effect of that Board's administration in securing a sober people is well known to us all.

Small-pox and Vaccination

My last illustration may be vaccination. Inoculation of diminutive doses of small-pox serum for the prevention of natural small-pox was introduced into England by Timoni, a Greek of Constantinople, in 1713, and was practised tentatively until 1798, when Jenner announced his method of vaccination with the serum of cow-pox as a means of protecting the human constitution from the infection of small-pox. This was substituted for the method of small-pox inoculation. Jenner also began forthwith the organization of communal vaccination. Subsequently Parliament prayed the King to "direct His Royal College of Physicians to inquire into the state of the vaccine inoculation in the United Kingdom, and to report their opinion as to the progress which it has made, and the causes which have retarded its general adoption." The College replied in 1807, and their memorable answer, signed by Sir Lucas Pepys, was the beginning of their leadership in small-pox prevention. Following on this declaration by the College there was a debate in the House of Commons on June 9th, 1808, in which Mr. Rose secured the assent of the House to a resolution, "that public benefit would be derived from the establishment of a central institution in London for the purpose of rendering vaccinia inoculation generally beneficial to His Majesty's subjects." On this resolution the Privy Council called upon the College of Physicians to appoint a Medical Board to inquire into the methods of vaccination generally used, with their success or failure, and to organize and set in action a central institution in Leicester Square for carrying on in London, under their own immediate superintendence, the practice of vaccination, and for distributing vaccine lymph to every part of the Empire. This Board continued until 1860.

Thus, for more than fifty years, the College of Physicians became the pronounced advocate of vaccination, undertook to initiate the control of the national movement for vaccination, inquired into its results, supervised its working, and standardized and distributed the lymph. Subsequently these duties were undertaken by the Privy Council from 1861 to 1871, by the Local Government Board from 1871 to 1919, and since that date by the Ministry of Health. Closely allied to this remarkable service of the College was their action a generation later in respect of antitoxin for diphtheria.

In 1890 the Conjoint Board of the two Colleges rendered powerful aid to the administrative and educational aspects of communal Preventive Medicine by creating a special Diploma in Public Health (under the Medical Act of 1886), followed subsequently by a comparable Diploma in Tropical Medicine and Hygiene.

CONCLUSION

Throughout its history the College of Physicians has been the foster-mother of sound medical practice, and in each of its four centuries has nurtured and cultivated the Renaissance spirit of true learning and inquiry. From its earliest years it has had many Fellows or Licentiates who have contributed to the advancement of the science and art of Medicine, and not a few who have moved forward our knowledge in Physiology and Pathology and their applications to Preventive Medicine. Named or unnamed, these are the workers whom we commemorate to-day, and whose works do follow them.

But their works follow them in a new world. The extraordinary advance in the science and art of medicine has supplemented the work of the family physician of a former day by providing an extensive system of general and special hospitals, laboratories, sanatoriums, and clinics, with a no less comprehensive system of specialists on the one hand and public medical services on the other. Yet the family physician will always remain the most economic and effective physician for the vast majority of human ailments. In any event the registered medical practitioner will be the first into whose hands will fall the recognition and treatment of the beginnings of disease. Moreover, the practice of medicine must always remain both *inductive* and *individualistic*.

There is evidence that the State appointed public doctors at least as early as Democedes (c. 510 B.C.), and the custom was extensively followed throughout the Roman Empire. In England the first obvious intervention by the State was in the sixteenth century on account of the existence of certain foci of disease among the poorest and most vagrant class of the community, neither able nor willing to obtain medical advice and yet contributing to the spread of disease in the community. It became apparent that the State was the only available authority which could direct the application of advancing medical knowledge and practice to the problem. In the first half of the nineteenth century such action of the State became more formal and statutory, both in providing medical and surgical treatment for the poorest classes and in formulating sanitary measures to protect the whole community against insanitary environment or the spread of infectious disease.

This profound and far-reaching development of a communal medical service has proceeded alongside the work of private practice. Since 1834 there has been a Poor Law medical service, and out of it a few years later emerged the Public Health Service, which in recent times has incorporated a number of special medical services, including those for maternity and child welfare, for the school child, and for health insurance, each of which had begun in a voluntary form and grown spontaneously before the State had recognized its validity. No single person and no single movement is responsible for this creation or its development; it has emerged as part of the social evolution of the time in which we happen to live. Speaking generally, however, it is expedient that certain principles should be recognized in any public medical service.

(*a*) The province of the State should be to bring the physician and the patient together under circumstances which will be acceptable to the patient, whilst facilitating and safeguarding the work of the physician;

(*b*) the State should encourage the provision of the necessary hospitals and clinics with proper equipment;

(*c*) no one, not even the State, should come between the physician and his patient, whether in private or in public practice. For the physician (and not the agency, whether voluntary or statutory, which brings his patient) must both diagnose the morbid condition and prescribe effective treatment;

(*d*) the State should exercise supervisory administrative control if the medical service in which the physician is engaged is communal or is paid for, partly or wholly, by rates or taxes.

There is nothing here which in principle departs from the primary and paramount benefit of the patient, or invades the reasonable prerogatives of the physician. Indeed, in the English health insurance system there is free choice of physician and patient; advice, treatment, and prevention within the compass of the knowledge and experience of the private practitioner; and the maintenance of the responsibility of the patient, through his contributions, for the payment of the practitioner. Moreover, the system is such that it imposes a check on excessive

claims of patients and on protracted benefit received during incapacity; in administration it is free from political control, for the management is in the hands of the contributor and the physician, as well as statutory bodies and the State; it provides for the education of the people in hygiene by their own physicians; and, lastly, it is so designed as to provide facilities for the initiation of research, and the keeping of fuller clinical records than in the past.

Such a system cannot *insure*, or indeed be ultimately effective, any more than private practice can be ultimately effective, unless the principles of preventive action in regard to the processes of disease in the individual are recognized and practised.

It is obvious that numerous problems lie in front of the development of the co-operative association of the private practice of a former time with the public medical services of a new epoch. One thing is clearly necessary and even predominant—namely, mutual co-ordination between all channels and means of medical activity, in order that the integrity and good will of the healing art may be maintained, and that the patient, be he rich or poor, may receive the full advantages of the science and art of Medicine which have become available since the days of Harvey's demonstration of the circulation of the blood.

GENITAL PROLAPSE: OBSERVATIONS ON ITS DIAGNOSIS, MECHANISM, AND TREATMENT*

BY THE LATE

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As Chaucer said of predestination, "Of it is great deputision, and hath been, of a hundred thousand men." He might have written so of prolapse in this year of grace.

Diagnosis of Prolapse

In considering the case of a parous woman who complains of pain in the back and is found on examination to have a lax vagina, it is easy to decide that the two features are associated, and one can very often prove that there *is* a relationship. But in many cases there is no association whatsoever. Many conditions other than prolapse have been sent to me in recent years with an intimation that operation for, or other treatment of, a prolapsing pelvic floor was considered advisable; each one of them had already been under treatment on that diagnosis, usually by a pessary. The following is a list of these conditions: cystitis, fibroids, ovarian cysts or solid tumours, urethral caruncle, visceroptosis, rheumatoid conditions of the lower lumbar spines, fibrositis of the lumbar muscles, spinal caries, root pain due to spinal tumour, scoliosis, sacro-iliac disease of one kind or another, spondylitis deformans, carcinoma of the cervix, constipation, and anal fissure. If ailments so varied can lead to a diagnosis of genital prolapse, surely there must be some lack of appreciation of the essential symptoms and features of that condition? I shall attempt to explain why these mistakes of diagnosis continue to occur, and in what directions subtler investigation would lead to more accurate diagnosis.

Symptoms and Signs

Any parous woman can have her vagina more lax than the average. *Many* women have "a pain in the back." But it is of paramount importance to appreciate the relation, or lack of relation, between this very common sign and this very common symptom. If I had to express in a few words one of the very essential features of prolapse, so far as diagnosis is concerned, I would put it as follows: *the symptoms bear less relation to the degree of prolapse than to the rate of development.* Two cases very similar at examination may present great differences in their symptoms. Prolapse has some features in common with flat-foot. While the condition is progressive there will be symptoms, but if the condition be stationary no symptoms need arise. The medical man, therefore, who examines a case presenting some suggestion of prolapse may readily be led astray by an observed laxity of the vagina. He has to decide, so far as he can, whether this laxity is merely due to multiparity, a descent without symptoms (that is to say, more or less stationary), or a descent that is in process of development.

One of the marvels of child-bearing lies in the amazing degree to which the pelvic floor can be dilated by a large-headed baby with a subsequent degree of involution which maintains the pelvic floor intact so far as symptoms are concerned. I think I have reasonable evidence that the popular idea of a further delivery being able to cure mild degrees of prolapse is not without some foundation. The question in such cases is really whether a subinvolution of the vagina and its adjacent supports, as the result of one delivery, can be overcome during convalescence from a subsequent labour. Those of us who operate have the clearest evidence, in many cases, that subinvolution of the pelvic floor as a whole, without marked injury, is an important factor in genital prolapse. If the vagina can be easily mobilized by gauze pressure, surely serious tearing can have been no important feature of the descent. It is wrong to consider subinvolution as a condition limited to the uterus. I would like to see more appreciation of the occurrence of a diffuse subinvolution of the *whole* pelvic floor. If this be admitted, the possibility of enhanced restitution as the result of a later confinement can only with difficulty be denied. Conversely, it is almost equally surprising to observe the amount of injury that can be inflicted on the genital passages by the rapid descent of a small and premature baby. One cannot, therefore, judge of maternal injury by looking at the newborn child. Still less can one judge it by the time taken to deliver a full-term child, provided that the duration of labour lies within reasonable limits. Further—and here I am afraid I am rather heterodox—it is a difficult matter in many cases to assign responsibility for symptoms of descent arising subsequent to the application of forceps. Nothing is further from my intention than to save the face of those who apply forceps unjustifiably. It may well be true that a high percentage of genital injury is due to an injudicious application. The indications for the application of forceps are clear and agreed; regrettably often they are not obeyed. This subject, however, is scarcely germane to my present thesis.

Some of the worst cases of prolapse I have ever seen were attended by midwives alone and showed no particular evidence of injury. On the other hand, I have seen the cervix outside the vulva in a newly born infant and in nulliparous women from adolescence to the sixties. Nulliparous prolapse certainly cannot be limited to those very aggravated cases where there is protrusion: the varying age incidence seems to prove that. A case in the sixties with the cervix beginning to protrude at the vulva *must* have had prolapse in progress for some time—probably for many years. There must surely be many cases of potential, or slight, nulliparous prolapse which, under the easiest possible circumstances of delivery, tend to become aggravated by that event. Tearing of the perineum *per se* is a negligible factor in prolapse. Some degree of abnormality higher up, be it more or less gross

* Based on a paper read to the North Wales Branch of the British Medical Association.

injury, subinvolution of structures constituting the pelvic floor, or congenital abnormality, is necessary for this to occur. Provided he has allowed the woman to deliver herself within a reasonable time, or has assisted her with forceps applied *non vi sed arte* and correctly as regards time and circumstance, the medical attendant has taken every reasonable precaution against the development of prolapse. But, for all that, prolapse *will* occur in a certain number of cases. I dare not assign the percentage associated with a congenital tendency to prolapse ; I merely suggest that it may be higher than is generally thought. Serious prolapse may occur with very reasonable intrapartum treatment, or even in the absence of any attention beyond the *laissez-faire* of the midwife. Probably most of these " midwife cases " without obvious evidences of serious injury are instances of the diffuse subinvolution I have mentioned.

To sum up, I submit that women may have gross degrees of genital prolapse and may never have a symptom worth calling a symptom, provided that the descent be slow, or at any time stationary. When a woman with prolapse of this very slow type develops any other condition that tends to cause pain in the back, discomfort in the lower abdomen, urinary frequency, or even irritation at the vulva, a wholly wrong conception of the case may be developed as the result of examination, and treatment may be carried out which is unlikely to relieve her of the symptom complained of.

Three Axioms

If the following simple points are borne in mind the diagnosis becomes relatively easy.

1. *Uncomplicated prolapse is absolutely postural.*—If I wish to complete the diagnosis of prolapse, say in a working woman, I ask her if she is glad to get to bed at night or if her worst day in the week is washing day. If she replies in the affirmative, or adds that walking is easier than standing, and that she has developed an unusual mental irritability, the diagnosis is almost certain. Dragging in the back is due to hyperaemia or stretching as the result of the lower position of the pelvic floor ; aching in the groins probably follows traction on the round ligaments from retroversion with descent ; and diurnal frequency of urination—that sure and common sign of prolapse of the vagina—is caused by downward displacement of the bladder. All of these become worse as the day goes on, and should disappear when the patient lies down. If they do not disappear there is either no symptomful prolapse at all, or there is some complication of it. Take, for instance, frequency of urination. Cystitis is an inflammatory condition, and the frequency it produces is present both by night and by day. Frequency due to prolapse is never present by night, but cystitis and prolapse may readily occur together. On the other hand, rheumatoid conditions of the lumbar spines or sacro-iliac joints and fibrositis are very definitely troublesome during the night, appear aggravated in the morning, and become somewhat better as the day goes on. If this post-meridian postural feature of the symptoms of prolapse is not appreciated, treatment of a prolapse that is really symptomless may very readily be undertaken with no resulting benefit and possibly some discredit.

2. *The symptoms of parous prolapse usually begin soon after, or are dated from, delivery.*—The three common unfortunate results of child-bearing—salpingitis, subinvolution of the uterus, and " sagging " of the pelvic floor—usually become obvious to the patient within a short time of delivery. If the process of prolapse is slow there may be, as I have indicated, an amazing tolerance ; yet, in the end, the woman may be driven to seek advice. Care should be taken to determine the factor leading to the delay. The woman may have hesitated to come for fear of an operation being suggested ; she may have been too busy with her family and postponed asking for relief ; she may have had a mild degree of vaginal prolapse for years, which gave her little or no trouble until it was aggravated by a cough, by unusual lifting strain as in home nursing, or rarely by fibroids or an ovarian cyst causing pressure in the pelvis. Finally, she may have known for years that she had a marked or even severe prolapse, but continued to carry on with a tight diaper, or even without it, until some pressure on the exposed part produced inflammation, excoriation, or swelling. It is advisable, therefore, in all cases suggestive of prolapse coming for advice many years after the last possible assault on the pelvic floor, to determine, if possible, the cause of the delay, lest operation be undertaken for symptoms that are merely concomitant and not intrinsic.

3. *Some women have very great difficulty in straining in the lateral position.*—This may occur even when, as should always be done, the sphincter ani is held very closely between the fingers or is pressed on by a pledget of cotton-wool. If there is doubt about descent, this should be tested for while the patient is standing, or while she is leaning forward, say, over the side of a bed, or, best of all, a ring pessary should be placed for a few weeks. If a pessary gives relief the diagnosis is clear. I would never dream of operating on any doubtful case where a suitable pessary produced no improvement. I have only one reservation to make—namely, that a rectocele alone may not readily be relieved by pessary treatment. In cases of prolapse with a complication such as cystitis, a pessary placed for a very short time will quickly and inevitably apportion the symptoms as between the two.

Mechanism of Prolapse

Fortunately little knowledge of anatomy is necessary for any broad discussion of this aspect of the subject. The supporting structures consist of two layers of muscle and connective tissue, readily grouped as, respectively, anterior and posterior to the lumen of the vagina. Of these two groups the anterior group is essentially the more mobile, and normally has a considerable sliding action on the posterior during downward stress. To find it sliding on the posterior wall, which is relatively fixed, is no sign that the patient's symptoms are due to prolapse. The degree of symptomless movement of the anterior wall of a multiparous woman is sometimes remarkable, and has led, I believe, to much error in diagnosis. Any subinvolution or tearing of these areas may produce symptoms as the result of descent. It seems to me that genital prolapse is best considered in terms mainly of the vagina and its adjacent supports. There can be no prolapse if the vagina is maintained as a stem—that is, the anterior wall lies parallel to the posterior, and the sliding movement is no more than this relationship will allow. Above this stem there may be a retroverted or retroflexed uterus, but retroposition *per se* is no primary element of parous prolapse.

The main types of parous prolapse consist of defects developing (1) near the lower end of the vaginal stem, (2) at its middle part, or (3) at its upper part, including the bases of the broad ligaments.

Injury to the perineal body alone is of little importance as regards prolapse ; I find that only 5.4 per cent. of the cases of complete tear of the perineum that I have seen in the last ten years had any symptoms referable to descent ; where prolapse was definite there was obviously a defect either in the anterior vaginal wall or, in general, at a higher level than the perineal body. Defect of the mid-vaginal stem may lead to subinvolution (redundancy) of the vagina, but will only implicate the uterus at a later stage, when traction by the descending vagina brings the uterus into retroversion and thereafter causes it to descend.

Defect of the upper vaginal stem, including the bases of the broad ligaments, will of necessity lessen the supports of the uterus, which may therefore descend through a vagina less obviously stretched than is the case in the preceding groups.

Naturally, there are combinations of these groups, but I state without reservation that the vagina and its supports are the main factor as regards both symptoms and treatment. *When we all reach agreement that, in the treatment of uncomplicated prolapse, the desideratum is the maintenance of a vaginal stem rather than a uterine position, a great deal of misapprehension will disappear.* I am sorry to record how frequently I am asked to do a hysterectomy for a prolapse that is usually largely vaginal (low defect), sometimes vaginal plus uterine (mid-defect), and only rarely mainly uterine (high defect). One of the very worst cases of prolapse of the vagina that I have ever had to deal with, where the whole vagina lay outside the vulva, with about four inches of the pouch of Douglas equally exposed, had had the uterus removed on the assumption that this was a case of uterine prolapse. Only the other day I saw in hospital a case of a young woman of 23, most of whose uterus lay outside the vulva ; she had been treated by an inexpert operator, who decided that a ventrofixation was the necessary and sole treatment. Three weeks after she got out of bed the uterus was outside the vulva precisely as before the operation—in other words, it had been slung up to the abdominal wall and left in mid-air, without any of that natural support which the normal vaginal stem is designed to give.

Prolapse of the vagina need be considered only in two groups—namely, incomplete and complete. According to the level of defect the uterus may or may not be involved, and, in general, the vagina and uterus need not descend *pari passu*. Where the defect is high and the uterus is a prominent feature of the prolapse, it is customary to divide the degrees of uterine descent into three groups, the middle group (second degree of uterine prolapse) being defined as that stage where the cervix lies outside the vulva and the corpus within it. Constrictor pressure at the vaginal orifice leads to some elongation of the supra-vaginal cervix, but this is very quickly reduced, up to a point, if the uterus be kept entirely within the vagina, or if the whole of it comes outside the vulva. There is nothing very essential in this classification except in so far as the uterus may, by this constrictor pressure, become a longer and heavier organ, and suggest thereby a need, during operative procedure, for an amputation of the vaginal cervix.

I have already mentioned some complications and concomitants of prolapse which may confuse the diagnosis and the treatment. There is, however, a concomitant which is rather intimately associated with the actual process, and which must be specially mentioned. I refer to subinvolution of the uterus. This need not be, but often is, obvious as a feature, and may need independent treatment—usually a curettage. The uterus cannot descend until it has retroverted ; this position is symptomless and forms no complication of prolapse. But if subinvolution gives rise to a uterus that is both retroverted and soft, there may be a tendency for the free fundus to sag backwards in greater degree. Retroflexion is produced thereby, and may require particular treatment as the result of the increased weight of an enlarged and hyperaemic organ in the pouch of Douglas.

Treatment of Prolapse

As regards the non-operative treatment, I cannot here discuss the preventive merits of exercises in the period immediately following delivery or the danger of lifting strain, when stooping, during that time. I will confine my remarks to treatment by pessary. By pessary I mean the ordinary watch-spring ring pessary ; there seems little need for anything more elaborate. A pessary should extend, but never distend, the vagina, and softness of its contour is therefore unnecessary. To test for good fitting, the breadth of a finger can be placed between its lower end and the pubic bone ; if this is impossible the pessary will either cause pain or be extruded. If there exists any retentive power at all, it is the big pessary, not the small one, that is extruded. A ring pessary by its gentle elastic pressure slowly unfolds the redundant vagina, and almost invariably by the end of one month a pessary that was well fitting to begin with will be found to be loose and in need of replacement by one of larger size. It is my custom to examine within a month every case where a pessary has been inserted (except where it has been placed for diagnostic reasons, and where the result will be speedily obvious), and to replace the original pessary by such larger size as is indicated. I recall a case, with troublesome urinary leakage as the worst symptom, where for domestic reasons no operation was possible at the time. The vagina would only hold a $2\frac{5}{8}$-inch ring to begin with, but, month by month, it became possible to increase the size, until, when a $3\frac{1}{4}$-inch ring was indicated, the leakage ceased. The fitting of a pessary is not always an easy matter, and it is asking a lot of any practitioner to keep a series of rings ranging, by eighths of an inch, from, say, $2\frac{1}{2}$ to $3\frac{1}{4}$ inches ; there may therefore at times be a chance that the only available pessary does not fit. I would like to see a greater appreciation of the fact that a well-fitting and fresh pessary is an important factor in the temporary treatment of genital prolapse.

A vaginal pessary has four uses: (1) as an instrument of diagnosis ; (2) as a temporary expedient ; (3) as a permanent expedient where operation is contraindicated ; and (4) as a method of treatment for cases where the uterus, before complete puerperal involution, lies in a position of retroversion, or where there is any postural symptom suggesting prolapse shortly after confinement. I am tempted to ask what good results would be obtained if *every* working woman received suitable pessary treatment for three months after delivery. Perhaps our post-natal clinics may in time be able to help us to answer this question. Post-natal attention is a very essential duty of the complete obstetrician, and probably temporary pessary treatment may be found to have an increased sphere of usefulness.

A pessary acts as a gentle splint maintaining intact the vaginal stem. By its use after labour it is admitted that much trouble in certain cases can be avoided ; by increased use perhaps still more advantage might be obtained.

Operative Measures

I do not hesitate to affirm most emphatically that every case of uncomplicated prolapse in a parous woman can be cured by a vaginal plastic operation along the lines developed by Donald and elaborated by Fothergill. We all have our operative failures, but as the percentage of these is so very low one must conclude that accidents of faulty union or misjudgement account for them. There is no need for " stunt " operations—they merely express an inventive reaction to personal failure to carry out a really satisfactory plastic operation. Occasionally an aggravated case may be met with where the pouch of Douglas, in association with an enormous rectocele, is so elongated that obliteration of the excess is advisable. But the desideratum in all operative treatment is to refashion the vaginal stem until it reverts very nearly to the nulliparous condition, and to support it in that position. In other words, the vagina must be so narrowed that its anterior and posterior walls once more lie together as parallel surfaces, the anterior on the posterior. If this position is maintained vaginal prolapse is impossible. If

the vagina cannot prolapse, the uterus above it cannot prolapse, and there is therefore seldom any need to treat the uterus at all in dealing operatively with uncomplicated prolapse. It may be advisable where the cervix is lacerated, infected, elongated, or thickened to amputate it in the course of carrying out an operation of colporrhaphies—I do this in the bulk of cases. But never will I believe that an abdominal suspension operation is necessary. I am a regenerate, for, until 1922, I was well satisfied with a combination of plastic operation with ventro-suspension. My results now, by vaginal operation alone, are not a whit inferior to those of earlier years. At the same time I regret that those who agree with me in the operative treatment of parous prolapse that I have outlined have not always clearly indicated their reasons for supplementing this operation, in an occasional case, by some abdominal procedure. If they will only be persuaded to study their case-history afresh I feel sure they will realize that abdominal operation was indicated, not for prolapse alone, but for a complication of it—nearly always a subinvolution of the uterus with retroflexion. A curettage plus some suspension operation is, to my mind, an ideal procedure for this complication, but I never regard it as part and parcel of my treatment of prolapse, and on occasion I do it in cases of subinvolution where no question of prolapse is involved.

It has been argued that colporrhaphies are contra-indicated within the child-bearing period. I do not subscribe to any such view, but I admit that the carrying out of an operation of colporrhaphies to produce the desired result, without causing dyspareunia, and without leading to the likelihood of trouble at a future pregnancy, is a matter of expertness. The age of the patient must always be considered. It is very easy to cure prolapse by narrowing the vagina, but if this should lead to dyspareunia some patients no doubt would prefer their prolapse. Where there is a probability of further pregnancies, it is best to do the least that, as one judges from experience of similar cases, will cure the tendency to prolapse. But never let it be recorded that operations of this type should be postponed for either of the reasons I have mentioned. Sound obstetrical treatment will be just as necessary at any subsequent confinement as at the original one, but, with an expert operator, a reasonable interlude, and a good obstetrician, there need be no great fear of recurrence.

THE AETIOLOGY OF DENTAL CARIES*

BY

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In this introduction to the discussion on the cause of dental caries some reasons are offered for considering that a peculiarity of the surface of the teeth, involving the presence of a crevice permeable to mouth fluids, is a necessary factor in producing the disease. The pathological reactions of the tooth to faults of the enamel and early enamel caries are briefly referred to. It is suggested that caries is a saprophytic phenomenon occurring either in morphological crevices or in developmental or acquired faults in the tooth surface, and that the tooth is powerless to prevent the onset of caries, though the progress of the disease may be retarded by vital reactions in the dentine. The aetiology of enamel faults and types of immunity to caries are discussed.

*Read in opening a discussion in the Section of Comparative Medicine at the Centenary Meeting of the British Medical Association, London, 1932.

Permeable Surface Defects as Precursors of Caries

There are four main clinical types of caries.

1. Fissure caries.
2. Interstitial caries.
3. Cervical caries.
4. Recurrent caries (after fillings).

Each of these can be shown to start in either a permeable crevice or a faulty area of the tooth surface.

Fissure Caries.—This starts in the depths of a natural fissure in the surface of the enamel. These fissures vary in their depth, and their susceptibility to caries increases with it. When unerupted teeth with deep fissures are immersed in dye, the dye is found on section to have penetrated to the bottom of the fissure (Fig. 1). The

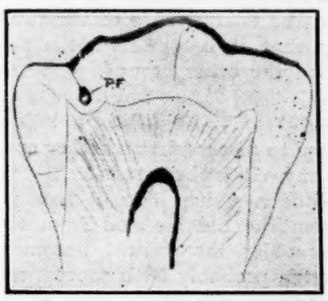

Fig. 1.—Drawing of an unerupted human premolar exhibiting a deep permeable fissure (P.F.) which is distended in its deepest part into a natural cavity, filled with epithelial debris. The fissure was shown to be permeable by immersing the tooth in methyl blue solution for a few days.

crevice, which is doomed almost inevitably to become carious because it forms a natural incubator for germs, is present before the tooth erupts.

Interstitial Caries.—Although the contact points of two adjacent teeth constitute an area of relative stagnation, they do not offer a cul-de-sac for harbouring germs, and are not so certain to become carious as are deep occlusal fissures. Nevertheless caries is much more common at the contact point than on any other lateral surface of the crown, so that stagnation is a factor. But as all contact points do not become carious in a given mouth despite the uniformity of their environment, we may assume another factor presumably of a structural nature. We can indeed narrow the issue, for in almost every case when a tooth does become carious at the contact point its neighbour also suffers in the same way, though it is a matter of experience that the two cavities are seldom equal in size. Often one is very large and the other only just starting in the enamel. It is significant, too, that the tooth with the larger cavity is as likely as not to be the more recently erupted of the two.

Now these two teeth, so far as their contact points are concerned, have exactly the same environment. The same drop of saliva hangs between them with the same lysozymes, the same *p*H value, and the same carbohydrate content. The stagnation is the same and the tissue fluid in the dentine is the same, yet one decays before—or more quickly than—the other, and it is by no means always the one that was there first which decays first. It follows that the factor which accounts for the earlier onset or quicker growth of caries in one of them must be a difference of structure in the two teeth, since the environment is the same ; and since a difference in structure in these circumstances implies an imperfection in the structure of at least one of the teeth, it would appear that caries starts in a fault in the enamel. These faults occur in the form of permeable lamellae and hypoplastic areas distributed at random on the surface of many teeth.

The bacteria multiply in them undisturbed, and gradually invade the surrounding enamel. It is reasonable to suppose that in interstitial caries the destructive process can spread to the enamel of the neighbouring tooth even though there is no pre-existing fault in it; but if the second tooth has a permeable fault also it will succumb all the sooner and—depending on its permeability—tend to have as large a cavity as the former. This does quite often occur, although the cavities are much more frequently dissimilar in size.

Cervical Caries.—This obviously occurs in a permeable fault in the tooth surface. The fault in this case is acquired and not developmental, for the gum has receded and exposed the cementum, which is permeable by virtue of the Sharpey fibres of the periodontal membrane embedded in it.

Recurrent Caries.—This only happens when a filling leaks, or when the enamel edge of the cavity is structurally so faulty that it becomes carious *de novo* and so falls into one of the other groups.

Pathology of Permeable Enamel Faults

It is necessary to discuss first whether enamel is capable of displaying any vital phenomena.

The enamel of a young dog is freely permeable to fluids both from the dentine and from the mouth. As the dog grows older the enamel becomes impermeable in its outer layers, probably by a process of keratinization of its organic content. Human enamel, on the other hand, is never freely permeable to fluids diffusing into it either from the dentine or from the mouth, though it sometimes contains traces of tissue fluid (Fish, 1932). Laidlaw and Jefferies, by using cataphoresis, have driven dye through the human enamel, but agree that it is far less permeable than dog's enamel, and that old dogs' enamel is far less permeable than young dogs. There can therefore be no reasonable doubt that while a fluid path exists across the enamel in human beings, it is not at all a free path, and that molecules the size of methyl blue or acid fuchsine can only pass along it in the majority of cases if they are impressed by a cataphoretic current of the order of 100 volts.

When a permeable fault exists in the surface of the enamel, it becomes filled immediately upon eruption of the tooth with mouth fluids containing food in solution and even solid food debris and micro-organisms. It is inconceivable that in the absence of any cells or blood vessels the traces of tissue fluid which sometimes enter the enamel for a short distance could, even if they reached the fault at the surface of the enamel, wash away the contained debris, seal up the fault temporarily, and then repair it. Such a service, when a permeable breach in the skin occurs, demands the presence of leucocytes, new capillaries, profuse extravasation of serum, granulation tissue, epithelialization, and fibrous tissue production.

But a more serious bar exists to the possibility of any vital reaction occurring in the enamel. Whenever mouth fluids enter a fault in enamel to a sufficient depth to irritate the dentine beneath, either the dentine hypercalcifies, producing a translucent zone which effectively isolates the lesion from the pulp, or the contents of the affected tubules die and are shut off, together with the enamel beyond, by secondary dentine, thus forming a dead tract in the hard tissues of the tooth, which is cut off by a barrier and lies completely outside the pale of nutrition. This observation (Fish, 1929)* has been corroborated by Boedecker (1930) and by Jefferies (1932). The latter shows that the barriers thus formed are still impermeable to dyes, even when they are subjected to cataphoresis.

* A more complete account is in the press, to be published in the *British Dental Journal*.

It therefore follows that a permeable developmental fault in enamel becoming contaminated upon eruption of the tooth is not only beyond the possibility of repair, but the whole area very quickly becomes shut off from tissue fluids, together with the underlying dentine (Fig. 2).

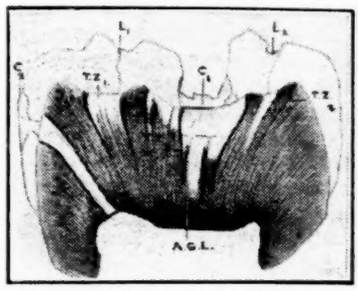

Fig. 2.—Drawing of adult human molar. Dye was placed in the pulp chamber and allowed to diffuse into the dentine before the section was cut. The dye entered the normal dentine everywhere, but was shut off from reaching the lesions in each case by a calcific barrier. The section exhibits a permeable enamel lamella at L1 stained by mouth fluids, but non-carious, and shut off from tissue fluids by a translucent zone (TZ1). L2 is a similar enamel lamella which is beginning to become carious and is isolated by a similar translucent zone (TZ2). C1 is a later stage, and exhibits enamel caries which is invading the dentine. The original translucent zone is becoming decalcified again at C1 and the tubules are infected, but the translucent zone (TZ3) is spreading and still completely isolates the caries from the tissue fluids of the pulp. C2 is either a permeable hypoplastic fault of enamel or early enamel caries. Not being in the occlusal surface it shows a dead tract instead of a translucent zone type of reaction. The invaded tubules, being devoid of dye throughout their whole length, must be sealed off at the pulp margin by secondary dentine, and so lie beyond the reach of tissue fluid from the pulp.

Such faults therefore constitute areas of necrotic tissue in which saprophytic phenomena may occur, and the only possibility of vital reaction checking the "disease" is by means of the calcific barriers surrounding these necrotic areas in the dentine. These barriers continue to be laid down in advance of the carious process, and it is evident that if they can be built of more resistant material they will delay the ravages of caries. No doubt the enormous differences observed in the rate of spread of caries in different teeth are due in part to this cause, though obviously the suitability of the environment to the saprophytes will also have a bearing on the rate of growth of the cavity.

It is, however, clear that once a tooth has been developed with a permeable fault in the enamel surface, no vital reaction can occur in the tooth which would prevent the incidence of caries. This can only be done by rendering the mouth immune to the saprophytes responsible for the putrefactive processes which, occurring in the fault, constitute caries.

Aetiology of Faults in Enamel

It has been shown by M. Mellanby that an absence of vitamin D from the diet during the development of the teeth in dogs always causes the enamel to be faulty, and it may be that the converse is true and that faults in the enamel are always due to vitamin D deficiency. It is, however, difficult to reconcile this with the clinical findings.

In view of the wide distribution of vitamin D in milk, eggs, butter, cheese, and animal fats generally, it seems surprising that almost the whole population, not only of this country, but of sunny countries like Australia, should be suffering from a deficiency serious enough to produce extensive caries. Yet a small percentage of the population is immune, not by any means confined to the wealthier classes, who are better housed and fed. Again, the faults in teeth which become carious are not anything like the hypoplasia of rickets, but consist of enamel lamellae and small patches of discoloured and chalky enamel on the undistorted surface of the tooth. A fault due to rickets is a distortion or pitting of the

enamel, which is not necessarily "chalky" in character. The rachitic fault, moreover, occurs in certain definite parts of the tooth corresponding to a given period of growth. Caries does not. Amongst the teeth most affected by vitamin shortage in rickets are the lower incisors; yet these teeth are almost immune to enamel caries. Surely if vitamin shortage in early life predisposed the teeth to caries, the lower incisors would be amongst the most susceptible, instead of being amazingly immune.

Mackay (1931), in a report on the association of vitamin D deficiency and dental caries, showed that there was only slightly greater incidence of caries in a group of rachitic children, 22 per cent. of whom showed hypoplasia of the enamel, than in a control group of normal children in which only 2.5 per cent. showed hypoplasia.

In any case the permeable point in the tooth surface which becomes carious is quite often not a developmental fault at all, and therefore has no relation to avitaminosis. The depth of fissures is a morphological characteristic. Recession of the gums which gives rise to cervical caries is a fault of the parodontal tissues rather than of the tooth, and recurrent caries is a matter of technique. Thus at most vitamin deficiency can only account for one of the four types of caries observed clinically—namely, the interstitial group. Even so, the deficiency would have to extend over a period of about twelve years to affect all the teeth in the way that caries does, and should logically be most intense in the twelfth year, when the wisdom tooth is developing. It seems more likely that the poor calcification of the wisdom tooth is a racial retrogression.

Interstitial and fissure caries appear to be definitely racial and hereditary in character. Tamil and Chinese coolies working together show an extraordinary difference in the incidence of caries. J. W. Field (1929) recorded that 100 Tamils had seven carious teeth while 100 Chinese had 163. Their diet was similar and so was their exposure to sunlight, though the chewing by the Tamils of betel nut with its caustic content might have had an antiseptic effect on the saprophytes.

Up to the Third Dynasty Elliot Smith reports that the Egyptians were free from caries. At this time an invasion of a foreign race occurred, and caries became as prevalent as it is in England to-day.* Even on Tristan da Cunha (Sampson, 1932), where hereditary and not racial factors predominate, of the 156 people examined 26 had an average of eight teeth each, either carious or missing, while 130 were caries-free, and these 26 were largely the "foreign" element of the population, in contradistinction from the 130, who were chiefly descended from the original stock.

In clinical practice in England it is a matter of common experience that good teeth run in families, so that whatever the factors may be which produce the faults and crevices in which caries develops, they appear to be hereditary.

Immunity to Caries

There are certain cases of this which are significant.

The human subject presents two types of immunity to caries. In one we find a perfect set of teeth with shallow fissures and faultless enamel. In the other type there are deep fissures and numerous discoloured patches of enamel which show traces of early caries, but the caries has now become completely arrested. The former type appears to have no flaws in which the organisms can lodge, the latter appears to have a mouth which has become inimical to the growth of the saprophytes concerned. If, as he gets older, the man with perfect enamel gets recession of the gums, the exposed necks of the teeth often decay, yet the enamel remains immune, showing definitely that his immunity had been due to absence of faults in the enamel.

* See page 760.

On the other hand the presence of faults alone is not sufficient to produce caries, as M. Mellanby has shown in her experiments on dogs where faulty enamel was constantly produced, but caries never supervened. Indeed, the dog is immune to caries, and yet it has both deep fissures and permeable lamellae with dead tracts of dentine under them (Fish, 1929). The same observation may be made in the human subject, for as we have seen the hypoplastic teeth of rickets are not especially prone to caries.

There is clearly a factor of susceptibility to an organism or a group of organisms without which caries cannot supervene. The apparently spontaneous arrest of caries is due to acquired immunity and not to a vital reaction in the tooth, since caries often becomes arrested in old broken-down dead roots as well as in deep fissures in vital teeth.

Normally, a change to relative immunity takes place as children grow up. No doubt this is to some extent due to the fact that most permeable faults have by this time been treated, or the tooth has been lost, but it may result in part from a change of diet from milk and sticky carbohydrates to savouries and the use of tea, alcohol, and tobacco. In the same way the use of betel nut may account in some degree for the relative immunity of the Tamil.

Conclusion

Thus all the evidence seems to point to caries being a saprophytic phenomenon occurring in morphological fissures, developmental enamel faults, or in the permeable necks of teeth. In no case can its occurrence be prevented by vital reaction on the part of the formed tooth, though its extension may be delayed. The prevention of decay appears to be possible only by rendering the mouth unsuitable as an environment for the saprophytes concerned, or by breeding a race free from morphological crevices and developmental enamel faults, whose gums will never recede.

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THE AETIOLOGY OF DENTAL CARIES*

BY

MAY MELLANBY

My only claim to address you is that of one who has devoted many years to physiological and biochemical research, chiefly in relation to teeth and their associated tissues. My approach to the subject of dental disease is therefore somewhat different from that of the clinician, and though we must ultimately arrive at the same destination, we travel by different roads. As none of us can claim to have reached the goal, it is perhaps only natural that we should each tend to emphasize the points elucidated in the course of our own work. No doubt the very fact that Dr. Fish and I have approached the subject from different angles and hold such opposing views prompted the committee to invite us to open this discussion.

* Read in opening a discussion in the Section of Comparative Medicine at the Centenary Meeting of the British Medical Association, London, 1932.

Animal Research

My real interest in dental problems arose about 1917, when I noticed that the teeth of my husband's experimental animals varied in character. The teeth of the rickety puppies were irregularly arranged in the jaws and were often rough and pigmented, while the teeth of those free from disease were white, shiny, and in perfect alignment. The failure of all recognized methods of preventing dental disease indicated the need for a different method of approach to the problem, and the opportunity arose, in these puppies, to study the factors modifying the development and resistance of the teeth and related tissues.

A diet was found on which the puppies grew well while their teeth were of poor quality. By making small, and apparently insignificant, additions or alterations to this diet the structure of the teeth and jaws could be completely altered. It was shown that:

1. For the production, in puppies, of well-formed teeth an adequate supply of fat-soluble vitamins, especially vitamin D, is essential. (This vitamin can be synthesized in the body by the exposure of the skin to sunlight or to the rays from an ultra-violet lamp.)

2. Cereals antagonize the action of vitamin D and tend to produce badly formed teeth when this vitamin is deficient.

3. The diet must contain some calcium and phosphorus, the chief components of teeth and bones, but the amount necessary depends largely on the vitamin D available. When vitamin D is plentiful the quantity and ratio of calcium and phosphorus (above a certain minimum) are of little importance, but when the supply is small, and especially when cereals form a large part of the diet, calcium and phosphorus assume a much greater significance. It is, for instance, possible by raising the calcium in some diets, especially when butter is the source of the vitamin, to convert an insufficiency of vitamin D into a sufficiency.

4. If a mother is fed during pregnancy and lactation on a diet deficient in vitamin D, the offspring show defective calcification of the deciduous teeth; but the defects are less marked than those found in the permanent teeth when the puppies themselves are fed on the same deficient diet, for the mother sacrifices her own stores of essential substances, and may in the process subject herself to harm if the dietetic conditions are severe.

These experiments have recently been repeated, and the main results confirmed and extended by many other investigators.

Vitamin C has been shown to influence the structure of guinea-pigs' teeth (Zilva and Wells, 1919, and later Höjer and others), but as far as I know it is rare to find defects in man of the type induced in these animals by a deficiency of vitamin C. On the other hand, the structural defects commonly found in human teeth are in many respects similar to those found in puppies fed on diets deficient in vitamin D, and the fact that human dietaries are often deficient in this vitamin suggests that the defects in the teeth of the experimental dogs and man are of similar origin.

Each vitamin has certain specific functions, and as we learn more about these substances the terminology has to be altered. The term "vitamin A" now has a narrower meaning than it originally had when it covered the anti-infective growth factor (to which it is now limited) and the anti-rachitic or calcifying factor (now called vitamin D). Both vitamins are fat-soluble, growth-promoting, and affected by heat and oxygenation, and it was for this reason that their actions were at first thought to be due to one entity. In my earlier publications the term "vitamin A" therefore includes both the calcifying and the anti-infective vitamins.

Although caries-like lesions have been produced experimentally in some animals, dogs' teeth appear to be immune to the disease. The normal variations in the minute enamel structure in different species, together with a natural or acquired immunity to the disease, may account, in part at least, for the difficulty of producing caries in some animals as compared with others. For these and other reasons experimental results are not necessarily applicable to the human subject, but they give a lead, and further work on these lines should prove fruitful.

Hypoplasia and Caries

Owing to the difficulty of obtaining a working basis by means of animal experiments, I have adopted an indirect method of testing the liability of human teeth to caries. A large number of shed and extracted teeth (mainly deciduous) were examined, both superficially and histologically, for structure and caries. In the majority the surface enamel was rough, and the minute structure of enamel and dentine was defective, the latter containing interlobular spaces. It was, in fact, clear that the ordinary standard for "hypoplasia" (giving about 3 per cent. of deciduous human teeth as hypoplastic) was not comprehensive enough, and that only comparatively gross defects were ordinarily included in this term. I have therefore used the term "hypoplasia" to denote defective structure of any degree or kind, and the term "gross hypoplasia" for those forms of superficial enamel defect which are commonly recognized. Hypoplasia was found in over 75 per cent. of the human deciduous and in the majority of the permanent teeth examined. The deciduous incisors, largely developed *in utero* and during lactation, were better calcified than the later-formed molars. For instance, about 60 per cent. of the incisors appeared normal on histological examination, as compared with 1 per cent. of the second molars.

Not only were the great majority of teeth in my collection defective in structure, but there was definite association between structure and caries. The worse the structure, the greater was the liability of the teeth to decay. Only 20 per cent. of the normal teeth were carious, as compared with 94 per cent. of the severely hypoplastic. This close association was found also in groups of Sheffield, Birmingham, and London children. In my experience, there is generally less hypoplasia and caries among the richer children and those living in institutions than among the poorer. Although the association between hypoplasia (as I have described it) and caries has been shown to be a close one, "gross hypoplasia" is not so definitely associated with dental disease.

Rickets

If structural defects are due to a deficiency of vitamin D, and these defects are associated with a liability to caries, it would be expected that the teeth of rickety children would be more liable to disease than those of the average child. The evidence, though not unanimous, generally confirms this expectation. Lawson Dick (1916) found that hypoplasia (gross) was common in the 600 rickety children he examined, and concluded that it was probably the chief factor in premature decay. J. G. Turner states that caries is rather more common in rachitic cases, and M'Gonigle, who examined some thousands of children, comes to a similar conclusion. Again, Wilson and Surie, working among native Indians, conclude that rickets and caries are coexistent. In the Board of Education inquiry (1929) it was found that most of the 1,300 London school children examined showed signs of rickets and caries. Rose and Mackay, on the other hand, compared the

amount of dental caries in some children, whom they had treated for rickets as babies, with that found in children who at a similar age had suffered from other diseases. They found that although hypoplasia (gross) was confined to the rachitic group, caries was only slightly greater in that group than in the other. The number of rickety children examined (42) was small ; it is possible, too, that the treatment they received would delay the carious process. Again, on the basis of recent work it is probable that many of the control children had also passed through a stage of defective calcification, possibly of less severity but longer duration. Some years ago Mr. J. W. Proud, L.D.S., and I examined the teeth of about 200 children diagnosed both at school and in infancy as rachitic, and found a higher percentage of caries in their teeth than in those of the average child.

Possibilities of Dietetic Control

Having proved to my own satisfaction that the better the structure of the teeth the less the liability to caries, and that structure could be controlled by diet, my next step was to see whether it was possible by variations in diet, especially in the vitamin D and cereal content, to alter the rate of initiation and spread of caries. To this end, from 1921 onwards a series of tests was made in Sheffield, in conjunction with Dr. Lee Pattison, on groups of children, most of whom had badly formed and carious teeth. It was shown that:

1. When the vitamin D content of the diet was increased, and especially when at the same time all cereals were omitted, the initiation and spread of caries were greatly reduced, while the " healing " or arrest of carious areas was very marked.

2. When the vitamin D content of the diet was decreased and extra cereal—for example, oatmeal—was given, the development of dental caries was increased.

An extension of the Sheffield investigations on a larger scale and over a longer period has been made in Birmingham on behalf of the Medical Research Council by Mr. A. Deverall, L.D.S., and Miss M. Reynolds, S.R.N., and the results corroborate those obtained in Sheffield. Boyd and Drain (1928) made some significant observations on a group of children suffering from diabetes. In the course of treatment these children were given a diet devoid of cereals and consisting largely of milk, cream, butter, eggs, meat, cod-liver oil, vegetables, and fruit (that is, a diet rich in vitamin D and calcium), and the process of dental caries was stopped. Later they fed some non-diabetic children on a similar diet, and again found that active caries was arrested. Bunting also found that of the methods investigated for combating dental caries, dietary measures such as the inclusion of much milk were the most important. He, however, believes that protection is through a change in environment rather than through an increase of resistance of the teeth themselves.

Further evidence bearing on the experimental and clinical observations has recently been obtained from Tristan da Cunha, the inhabitants of which rarely suffer from dental caries ; their diet includes foodstuffs containing vitamin D and calcium, but is devoid of cereals, and the children are breast-fed for long periods. Other examples of peoples comparatively free from dental disease are the Eskimos and some tribes in tropical lands. Under natural conditions the diet of the former is rich in fat-soluble vitamins and free from cereals. In tropical countries breast-feeding is prolonged in many native tribes, and although the diet consists largely of cereals and the vitamin D content may be low, the skin is exposed to the sun's rays, and the necessary vitamin D is thus synthesized in their bodies. As soon as civilization reaches these peoples the conditions are altered in relation to both diet and clothing. Ultra-violet rays are often prevented from reaching the skin, even of young children. During a visit to Africa some years ago I examined the mouths of hundreds of natives, and found that, although the majority had excellent teeth, the more the tribes conformed to civilized conditions the worse was their dental condition. Heredity has certainly failed here.

In order to test the resistance of erupted teeth, animal experiments were made resulting in the deposition of secondary dentine. A potent calcifying diet during the period of irritation resulted in abundant well-formed secondary dentine ; if the calcifying factor was deficient there was no apparent reaction or the secondary dentine formed was imperfect in structure. Here, then, is further evidence that dental reaction can be influenced by nutritional factors.

Contrary to Dr. Fish's experience, I did not often find a " fully calcified barrier " between primary and secondary dentine. This problem, together with that of the character and significance of translucent zones and " dead tracts," will be discussed by others who are much more competent to speak on the subject.

Summary and Conclusions

To summarize, fat-soluble vitamins (especially vitamin D) are essential both for calcification of the teeth and for their resistance to disease. The quantity required depends on other factors of diet and environment, including calcium, cereals, and ultra-violet light. The natural foods containing vitamin D, with which calcium and vitamin A are often associated, are, unfortunately, comparatively expensive. They include egg yolk, milk, suet, butter, and cheese. (Milk is an excellent food, but I am not yet convinced that there is sufficient evidence that fresh milk is better than the pasteurized product.) Cod-liver oil and some other fish oils are the richest known natural sources of vitamin D ; it is present in fat fish (for example, herring, mackerel, and salmon), and also in animal fats (except that of the pig). Vegetable oils as prepared for consumption in England do not usually contain the vitamin. Cereals are cheap, easily stored and transported, and are therefore very common articles of diet ; they are not only devoid of vitamin D, but contain some toxamin, which tends to hinder calcification ; the greater the part they play in the dietary the greater must be the intake of vitamin D and calcium to antagonize their effect.

The clinical work mentioned is only the beginning of this important aspect of nutritional science, for we do not even know the optimum amount of vitamin D required in relation to the other factors of diet and environment.

The literature published during the past decade shows that more attention is being focused on dental caries as a disease resulting from metabolic rather than purely local disturbance. If I have played any part in this new outlook I shall feel justified in having entered the field of dental research.

In conclusion, while I readily admit that the liability of a tooth to decay must depend upon many factors, both intrinsic and extrinsic, I believe that the structure of the tooth is a factor of the highest importance, that this depends in turn upon the diet during the period of growth, and that after eruption its resistance to caries can also be influenced by dietetic conditions. We must, therefore, I believe, concentrate upon the development of more perfect teeth and later also upon increasing their resistance to decay. The practical application of our present knowledge should in time help to diminish the scourge.

ACUTE OSTEOMYELITIS IN CHILDREN*

BY

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It might be thought that the subject of osteomyelitis in children has become rather hackneyed of late, but there can be no doubt that the disease to-day differs in some respects from that of thirty years ago. In the first place, acute osteomyelitis in children is a disappearing disease, and this is borne out by figures that I have been able to obtain from different hospitals in the United Kingdom.

Hospital	No. of Cases 1900–10	No. of Cases 1920–30
Edinburgh Royal Infirmary	404	208
King's College Hospital	92	33
Westminster Hospital	70	36
London Hospital	100	121
Belgrave Hospital for Children ...	72	16
Evelina Hospital for Children ...	63	63
Victoria Hospital for Children ...	31	54
Queen's Hospital for Children ...	15	89

It will be seen that in some hospitals the number of cases is much reduced, while in others it has grown; the increase in some cases is due to the fact that the number of beds was increased during the years 1920–30 in the hospitals in question, and therefore the increase is more apparent than real. In others more cases are admitted than formerly, because they are not sent on to various rate-aided institutions.

The gradual disappearance of acute osteomyelitis is due to the fact that the general health of children is much better. Tonsils and adenoids are removed at an early age, and this in itself allows better aeration of the lungs, does away with septic infection of the throat, and prevents many complications occurring after infectious fevers. Debilitating and deficiency diseases of infancy are treated very effectively. Slum clearance in the British Isles is going ahead, and tenement houses with adequate washing facilities are now found in most of our big cities. The streets are cleaner and the drainage system satisfactory. There is also a tendency for these acute cases to be sent to hospital much earlier than in former years, and so early cases are seen to-day, while it was generally the late ones that were seen thirty years ago. These are the real factors in preventing the common occurrence of acute osteomyelitis in children when it is considered that the condition is a septicaemia, due in the vast majority of cases to the staphylococcus, the organism getting into the blood stream either from a septic infection on the skin, such as a boil, or from a septic tonsil, or in other cases as an enteritis.

In all probability trauma plays no important part in the causation of acute osteomyelitis, but textbooks have always stressed it as a causation for many years, and therefore it is still recorded as an initial cause. If trauma were an exciting cause there would be evidence in some cases at least of injury of the skin or soft parts, but this is always lacking. Again, in cases of fracture of the long bones, due to direct trauma in children, osteomyelitis does not ensue, and in many cases of compound fracture where excision of the wound edges is carried out good union of the fracture takes place without any sign of osteomyelitis. No doubt, in many instances, the reason why a history of injury is obtained is the fact that acute osteomyelitis is sudden in onset, causing sharp pain near the growing end of the bone; this pain may cause the child to cry out, and in some cases to actually fall down, when the disease is affecting one of the bones of the lower extremity.

In children osteomyelitis commences on the diaphyseal side of the epiphyseal plate, and 50 per cent. of the cases occur in the femur and tibia. This frequency in the bones which take part in the formation of the knee-joint is due to the fact that more rapid growth of bone takes place there than in any other situation. The following list shows the site of infection in 100 consecutive cases in children.

Bones Affected by Acute Osteomyelitis in Children under 12 in 100 Consecutive Cases at King's College Hospital and the Belgrave Hospital for Children

Bone	No. of Cases	Bone	No. of Cases
Femur	30	Fibula	3
Tibia	23	Carpus	3
Humerus... ...	16	Clavicle	2
Ulna	10	Scapula	2
Tarsus	5	Pelvis	2
Radius	4		

Fraser, in reviewing 200 cases, found that the femur and tibia accounted for 59 per cent. The blood vessels to the growing end of a bone are numerous, because not only does the nutrient artery supply the metaphysis, but vessels from the periosteum, epiphysis, and juxta-epiphyseal region all take part in bringing blood to this area. This blood supply, however, at the actual margin of the metaphysis is in a series of tortuous loops, which are narrow and inelastic, and are in reality end-arteries. This interesting anatomical arrangement favours the occurrence of embolism, which would in itself cause a devascularization of an area of bone in the immediate neighbourhood of the metaphysis. This is the most probable way in which acute osteomyelitis starts in children.

The small area of infection, having started in the vascular marrow of the metaphysis, is in reality a considerable distance from the medullary cavity of the bone, and therefore, in the early stages of the disease, it is not necessary to open the medullary cavity in the treatment of the condition.

The course of the disease is governed by the virulence of the organism and the power of resistance of the patient. When pus formation takes place this may tract to the surface and travel under the periosteum, and cause that membrane to be stripped up for a certain distance. If, however, the infection is more severe, the medullary cavity is involved early and the infection may spread the whole length of the cavity and the whole diaphysis may be killed and become a sequestrum. All grades between these two conditions may be met with, so that each case requires to be treated on its merits. In those cases where the capsule of the joint covers the metaphysis the joint is directly infected; this always takes place where the neck of the femur is involved. In other cases the delicate lymphatics which run from the bone to the capsule of the joint may be the medium whereby the joint itself becomes infected; while in rarer cases still the epiphyseal plate of cartilage may be perforated and the joint thereby infected.

The actual pathological picture of acute osteomyelitis is similar to that of any other acute infection, but with the added factor of bone involvement. It is this factor which invariably makes the symptoms so acute and severe, because the infection is imprisoned in a dense bony capsule. If drainage is not established at an early

* Read in the Section of Diseases of Children at the Centenary Meeting of the British Medical Association, London, 1932.

date there is a great possibility of destruction of the thin-walled vessels in the bone, and infection will then reach the general circulation. It might be thought that a blood count would be an indication of the virulence of the infection and of the patient's power of resistance, but this is not borne out by practical experience, for the average leucocyte count in my cases was 18,000 to 20,000, with a polymorphonuclear percentage of 80. This in itself does not help very much, but may explain why intravenous antiseptics, such as mercurochrome, do not seem to have any influence on the disease.

It is quite conceivable that in some cases the patient's powers of resistance do overcome the infection, and the area becomes walled off, and an isolated or Brodie's abscess is formed. Such an abscess will be pushed further and further away from the growing end of the bone, so that eventually it comes to lie at a considerable distance from the epiphyseal line. Sometimes an actual sequestrum can be seen in the centre of the abscess cavity in good skiagrams. Unfortunately *x*-ray examination is generally of little use in the early stages of acute osteomyelitis in children, and if the surgeon waits until there is something definite in the *x*-ray picture he will wait too long, and valuable lives will be lost.

Treatment

The treatment of acute osteomyelitis must be definite and thorough, but no dogmatic statements can be made as to the treatment in every case, for each must be treated on its merits. Every case, however, requires immediate drainage, and no time should be lost in establishing this ; any delay may cause extension of the primary focus and the medullary cavity may become infected, which adds to the gravity of the case. As there is a tendency to-day for the disease to assume a milder form, so there is a definite tendency for the treatment to be more conservative. To my mind the medullary cavity is not involved in early stages, and should not be opened up as a routine in every case. In early cases a simple trephining of the diaphysis just above the epiphyseal plate often is all that is required; efficient drainage is established—and that, after all, is the keynote of treatment. If after the small portion of bone has been removed the surrounding bone does not appear healthy and no bleeding takes place, then further exploration must of necessity be carried out, and the medullary cavity opened up, even to the whole of its extent if living bone is not discovered. In some cases a wedge of diaphysis can be removed after the trephine has exposed the affected bone and the focus of infection thereby completely eradicated ; this is, of course, the ideal treatment in early cases.

In well-established cases the medullary canal requires to be opened up and one-third of its circumference removed. This gives adequate and efficient drainage ; if more of the circumferential bone is removed a weak bone is left and fracture may take place.

As to whether multiple drill holes made down to the focus of infection can in themselves act as drainage to the area, it seems most probable that if they were efficient at first there would be a great tendency for granulations to fill up the holes and for pus to become "pocketed" beneath them, necessitating another operation ; I have seen this required in several cases so treated.

With regard to the pros and cons of diaphysectomy, in the treatment of acute osteomyelitis I am firmly convinced that if the case is a late one and the whole of the diaphysis is involved diaphysectomy is the only method to be adopted, followed later by a bone graft. Such cases, however, are rare, and should be getting fewer every year. The late results of these cases are not encouraging if they are followed over a series of years. Partial diaphysectomy, though advocated by Rankin of Glasgow and others, does not seem justifiable, and the guttering of the bone gives, in my opinion, better results, because sequestrum formation will always take place and the recuperative powers of the bone and periosteum in children are phenomenal.

The after-treatment of these cases may be said to be as controversial as the treatment itself, and many new forms of treatment have been instituted of recent years. Winnett Orr has established the fact that such cases can be treated with iodine and then mopped dry, and the gutter in the bone filled with sterile vaselined gauze. The limb is then fixed in plaster-of-Paris so that the joint above and below the bone involved is immobilized. Healing will take place under the plaster, but the odour in these cases prevents them from being nursed in the wards, and therefore this treatment can only be carried out where there is liberal balcony accommodation. Antiseptic gauze will answer the purpose quite well, and dressings can be carried out every other day ; it is essential that fixation on a skeleton splint with plaster should always be established, as this ensures rest of the inflamed bone and so lessens the patient's pain. Constitutional treatment, which is all-important in these cases, cannot do any good if the little patient is in constant pain.

The use of maggots in the treatment of osteomyelitis, although used with success in America, does not seem to have many advocates in this country, and sensitive children would be very distressed to have crawling maggots placed in their wounds.

Conclusions

In conclusion it may be said that:

1. Osteomyelitis in children is a disappearing disease.

2. The disease is not so fulminating as formerly, and that is due to the fact that the general health of the children is better.

3. Trauma plays little or no part in the causation of the condition.

4. Early drainage is the essential treatment.

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Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

SURGICAL EMPHYSEMA COMPLICATING ARTIFICIAL PNEUMOTHORAX

Minor degrees of subcutaneous emphysema in the course of treatment by artificial pneumothorax are common, their unimportance being evidenced by dismissal in a line or two in textbooks. Emphysema of severe degree appears to be uncommon, few references being found in English literature as to effectual treatment.

History of Case

A male aged 26 years had had treatment elsewhere for two months without material improvement. On admission the general condition was good, but there was some degree of cyanosis; temperature, 97° to 99°; pulse, 80 to 112. Some cough and dyspnoea. Impaired resonance over right upper lobe and down to root of lung, with coarse rales all over the lung; the left lung was clear clinically.

X-ray examination: Right apex opaque, with no response to cough; diaphragm moved well, with costo-phrenic angle clear; dense mottling with cavitation in upper and mid-zones; small area of mottling in left mid-zone.

The patient was kept at absolute rest for a further six weeks, but lost weight; pyrexia continued. During induction of right artificial pneumothorax the pleura was felt to be thick and tough. The preliminary manometer reading −3, −1, indicating limitation of the pleural cavity by adhesions. In view of the bad prognosis even partial collapse appeared desirable, and 200 c.cm. of air was introduced, the final reading being −2, +4. The patient was quite comfortable. Two hours later he had a severe bout of coughing and felt a sharp pain in the right side, soon after complaining of stiffness and swelling of the neck. No crackling could be made out over the site of puncture. Cough continued to be severe, and within twenty-four hours the patient was unrecognizable, resembling the well-known figure advertising a make of motor-tyre. The emphysema affected the whole of the trunk, both arms and legs, and neck and face, with large blebs of gas under the conjunctivae and mucosa of nose and mouth. Only those parts compressed by his position in bed, the ears, and scalp were spared. The skin on the chest was lifted from the deeper structures by approximately 4 inches, and during the next seven days, in which the degree of emphysema appeared to be maintained at its maximum, several areas became red and glazed.

Treatment consisted in frequent attention to the eyes, nose, and mouth, gross infection being prevented. An attempt to draw off the air originally introduced was unsuccessful. Puncture of the skin could not be persisted in owing to the danger of sepsis, and the most effectual measure appeared to be the general application of heat and relief of tension on danger points by change of position and compression.

Comment

The risk of occurrence of emphysema of such severity may be limited by more careful selection of cases, low pressures, small needles, and control of cough; it may occur when spontaneous pneumothorax appears during treatment by artificial pneumothorax, or when adhesions are ruptured. The air may leave the pleural sac through the puncture or travel along the subfascial plane, but it is more likely to track backwards interstitially to the hilum of the lung and mediastinum,[1] appearing first in the root of the neck—in such cases it may appear round the kidney[1] and even infiltrate the pericardium.[2] In the case reported it is probable that an adhesion was ruptured during the bout of coughing; the degree of emphysema could not have been caused by the amount of air introduced.

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[1] Ballon and Francis: *Arch. Surg.*, December, 1929.
[2] Aronson, A.: *Tubercle*, June, 1922.

Reports of Societies

PLASTIC SURGERY

At a meeting of the Harveian Society of London, held on October 13th at the Hammersmith Hospital, with Mr. C. P. G. Wakeley in the chair, Sir Harold Gillies gave a lantern and cinematograph demonstration on plastic surgery.

Sir Harold Gillies first exhibited a girl of about 8 years of age to the meeting. When admitted to hospital she had had a purple naevus extending from the bridge of the nose to the upper lip and on to both cheeks. He had brought down the skin of her forehead on a double temporal artery pedicle, so that it covered the naevus over her nose and on the cheeks; the area of naevus on the upper lip had been replaced by a Thiersch graft, and a similar graft had been used to cover the stripped forehead area. No trace of the naevus was now apparent.

The first cinematograph film showed a buccal inlay in a patient severely scarred by lupus. These patients, Sir Harold said, frequently suffered from shortage of mucous membrane in the mouth, the lower lip being tied down to the gum by scarring. With intratracheal anaesthesia the pharynx was packed with gauze, the lower lip was freed from the jaw-bone from the base of the teeth to the tip of the chin, and into the sulcus so formed dental modelling material was packed and a mould made. A thin skin graft, taken from the arm, was then folded round the mould in such a way that the raw surface of the graft lay outside and the uninjured surface in contact with the mould. The mould was inserted into the sulcus so that the raw surface of skin was in apposition with the raw surfaces of the wound. Sir Harold pointed out the importance of cutting a graft of even thickness and all in one piece; if it was torn the fragments were certain to be displaced when the mould was slipped into position. By means of lantern slides it was demonstrated that the retracted upper lip could be freed in the same way in cases of repaired hare-lip. Once the loss of mucous membrane had been replaced by a skin graft the lip could be brought forward on a dental appliance to give the normal contour. Other slides illustrated the treatment of the depressed nose of congenital syphilis on similar lines. Here again, the speaker said, the important factor was loss of mucous membrane. This was made good by a skin graft introduced on a mould through the mouth, the incision being made in the angle between the upper lip and the anterior surface of the maxilla. Once the graft had taken the patient could use a dental appliance to keep the nose forward, or a cartilage bridge could be introduced. Burns with severe scarring could be repaired by Thiersch grafts; the excellent results obtained where scarring had led to severe ectropion of the eyelids were demonstrated by slides.

A second film showed the restoration of the nose in a small boy, cured of lupus. The scar tissue of the original nose was used to form the lining of the new one. Special care had to be taken to ensure that this flap had a good blood supply, as many of these cases had a poor vascular supply in the healed skin owing to treatment with *x* rays. The skin flap for the new nose was taken from the forehead, brought down on a sickle-shaped pedicle, and stitched into place with fine silkworm-gut on eyeless needles. Other examples illustrated by slides were: a case in which a forehead flap had been used to repair a hairy mole on the cheek, and the method by which pedicle grafts could be taken from the abdomen, first to the arm, and then to the scalp, by division of the original pedicle. This was applied in a case of avulsion of the scalp.

In a third film an operation for virginal hypertrophy of the mammae was demonstrated. Sir Harold said that as much as six or eight pounds of degenerated breast tissue and fat might be removed. A circular incision was first made round the nipple so as to preserve some of the ducts. This was followed by two curved incisions with the concavity towards the head of the patient, one above the nipple and the other on the under surface of the breast

near the junction with the thorax. The superior flap was undermined and a sector of the breast excised. The remaining breast tissue, forming a long pedicle terminating in the nipple, was coiled down and stitched into position. The skin between the two curved incisions was removed, and the edges of the wound brought together in such a way that the upper flap completely covered the breast tissue and nipple; a perforation was then made in the flap at an appropriate point, through which the nipple was delivered and stitched into place.

Slides showing the value of Thiersch grafts in the treatment of *x*-ray burns were followed by a film of a case in which such a burn in the buttock region had been repaired by means of pediculated skin flaps. A film on the operation for face lifting with pre- and post-auricular incisions, and the removal of an elliptical strip from the upper eyelids, was also exhibited. This second operation could also be performed in cases in which pendulous, heavy upper lids actually interfered with vision. A final group of slides showed the result of a series of repair operations on a patient who had fallen face downwards in a smouldering fire during an epileptic fit. The nose had been completely destroyed, the lips burnt away, the frontal sinuses laid open, and the eyes blinded. Repair operations were carried out in the hope of functional rather than cosmetic results, and had been amply justified in the benefit to the patient.

TREATMENT OF LATE SYPHILIS

At the first business meeting of the Mid-Staffordshire Medical Society, held at Stafford on October 4th, with Dr. NORMAN ANDERSON in the chair, Colonel L. W. HARRISON, in an address on the treatment of the later manifestations of syphilis, dealt with the most suitable remedies for interstitial keratitis, syphilis of the tongue, stomach, liver, kidney, and cardiovascular and central nervous systems. He said that gastric syphilis was commoner than was generally supposed, and routine serum tests were desirable in intractable and obscure dyspepsia. The arsenical preparations were suitable in renal lesions, but should be avoided in liver disease, for here the various forms of bismuth were superior, especially the oxychloride. Cardiovascular syphilis often went untreated until the cardiac wall was involved. Arteritis of the mouths of the coronary arteries was not uncommon. Syphilitic myocarditis was intolerant to arsenical preparations, and as coronary arteritis was often aggravated by the first dose treatment should be cautious. Cardiovascular syphilis was the most potent cause of sudden death in the age period 35–60. Ordinary anti-syphilitic remedies were efficient for syphilis of supporting structures of the central nervous system, but were of no use in general paralysis—patients might develop G.P.I. when actually undergoing treatment with arsenical and other preparations. Although pyrexial treatment might give good results in tabes, this disease often responded very well to ordinary anti-syphilitic treatment, such as bismuth and potassium iodide. As regards latent syphilis Colonel Harrison advised routine serum tests—a positive Wassermann always demanded treatment. He concluded with a plea for a broader and more rational outlook on the treatment of syphilis. Treatment should not be deferred until irremediable fibrosis had ensued.

The twentieth annual report of the *Journal of the American Medical Association* on the cities of the United States with a population of more than 100,000 (of which there were ninety-three in 1931) shows that the total typhoid mortality rate in the seventy-eight cities whose records are available for the whole twenty-one-year period is almost exactly the same as for the two preceding years. It is too soon to conclude that a stable period in the urban typhoid rate has been reached for the whole country. It appears, indeed, more probable that a further decline will take place. In twelve of the ninety-three cities no typhoid deaths occurred in 1931, this being the largest number of cities with perfectly clear records ever reported by our contemporary.

Reviews

RESEARCH ON LYMPHADENOMA

The Rose Research on Lymphadenoma was founded by Mrs. T. E. Rose in memory of her daughter, who lost her life from this disease; the volume now published[1] shows that the endowment has led to results of considerable interest. Several important pieces of work were done and the results published by Dr. Twort, the first Fellow, and the research has been continued by a team of workers under the direction of Dr. M. H. Gordon.

The chief interest centres, naturally, in the problem of the aetiology of the disease. Regarding the lesion as a granuloma, Dr. Gordon's first endeavour was to ascertain whether it was caused by any one of the organisms known to produce granulomata. With regard to the tubercle bacillus, three of forty guinea-pigs inoculated with lymphadenoma tissue gave positive results, while nineteen controls inoculated with tissue affected with diseases other than tubercle or lymphadenoma gave two positive results. The incidence in lymphadenoma was no greater than that exhibited in other diseases. The search for spirochaetes was carried out in six cases, and the results were negative in all. Attention was next directed to mycotic organisms. These have recently been the subject of considerable research: thus in America nearly three hundred cases have been identified of a granuloma due to the action of *Coccidioides immitis*; in a granulomatous disease affecting the natives of Brazil, and resembling lymphadenoma, Dias also succeeded in growing a pleomorphic fungus ranging from yeast cells to hyphae, oblong forms, bacilliform elements, and indeterminate forms in 50 per cent. of the cases; and in Harvey Cushing's clinic a granulomatous lesion of the brain was found to be associated with a pathogenic yeast, the *Torula histolytica*. Before proceeding to investigate material from lymphadenoma cases, a preliminary study was made of the sporothrixes of Schenck, de Beurmann, Gougerot, and Jeanselme, of the *Coccidioides immitis*, of a number of pathogenic yeasts, including the *Torula histolytica*, of the thrush fungus, and of Aspergillus. These organisms were examined with regard to their morphological and cultural characters and their pathogenic action, and the descriptions, beautifully illustrated, are of much value as showing the kind of reaction which fungi produce in animal tissues. In the search for the presence of fungi and yeasts in lymphadenoma, microscopical examination, cultures, and the injection of suspensions of the glands were employed, and although granulomatous lesions were produced by some of the organisms, no evidence was obtained indicating that lymphadenoma is due to mycotic infection by any of the organisms mentioned.

The results of the research so far seemed to show that lymphadenoma is not due to any organism demonstrable by present bacteriological methods. Dr. Gordon has, however, succeeded in showing that a specific pathogenic agent is present in the glands. This is demonstrated by injecting suspensions of gland tissue, sterile to ordinary tests, into the brains of rabbits. After an incubation period of from two to six days a characteristic disease is produced, somewhat resembling the encephalitis excited by the viruses of vaccinia, herpes, and psittacosis, but differing in its slower evolution and in the occurrence of muscular rigidity and spasm, often combined with paralysis, and accompanied by progressive wasting. The agent appears to be limited to cases of lymphadenoma, since the injection of gland tissue from control animals suffering from other diseases gave negative results. With

[1] *Rose Research on Lymphadenoma.* Bristol: John Wright and Sons, Ltd.; London: Simpkin Marshall, Ltd. 1932. (Pp. 136; 98 figures. 1 guinea net.)

the exception of one case, in which a lymphocytic exudate was present in the meninges and around the vessels of the brain, no gross pathological lesions were observed post mortem except congestion of the membranes. The pathogenic agent is non-filterable, withstands desiccation, and shows considerable resistance to heat. Although suspensions of the glands show nothing definite when stained by current laboratory methods, a modified technique has revealed the existence of minute granules of the same order as those occurring in vaccinia and psittacosis ; the significance of these is doubtful at present. Photomicrographs of the bodies are contributed by Mr. J. E. Barnard. From the available evidence Dr. Gordon concludes that the pathogenic agent in lymphadenoma is probably a virus of the same category as the specific agents of vaccinia, poliomyelitis, herpes, and psittacosis.

With regard to the nature of the lymphadenoma nodule, Dr. Pullinger, in her article on the histology, is inclined to doubt whether it is really a granuloma. A clear distinction is made between vascular endothelium and reticulum cells, and vascular changes are considered to play no essential part in the process, which is regarded as a hyperplasia of the reticulum cells simply. The structural resemblance between the lymphadenoma nodule and a granuloma is recognized, but this is held to depend on the fact that the reticulum cell is capable of proliferating into all the constituents of a granuloma, and into granular leucocytes. It is suggested that the lesion is allied to the leukaemias. In the investigation of the relation of the fungi to lymphadenoma, a preliminary study of the characters by which the various strains of these organisms could be recognized was necessary. The details of experiments on this subject are contained in the articles contributed by Dr. L. P. Garrod, Dr. Kenneth Stone, and Dr. E. R. Cullinan. A preliminary chapter on the clinical aspect is contributed by Sir Thomas Horder.

PYORRHOEA ALVEOLARIS

Under the title *Pyorrhoea Alveolaris : The Etiology, Pathology, and Treatment of Chronic General Periodontitis*,[2] Mr. F. W. Broderick has published in book form his essay which won the last Cartwright prize of the Royal College of Surgeons. His main thesis is that pyorrhoea and dental caries are antagonistic lesions so far as their aetiology is concerned, pyorrhoea being dependent on an alkalosis of the blood and caries on acidosis. These conditions are reflected in the saliva, leading in the case of alkalosis to deposition of the excess of calcium as subgingival tartar, and so to pyorrhoea, and in the case of acidosis to caries by withdrawal of the lime salts of the enamel (by the action of the acid saliva) to compensate the acidosis. Put baldly, the thesis sounds improbable, but as presented by the author it takes on a plausible and even fascinating aspect. Mr. Broderick shows a wide acquaintance with biochemical literature, and quotes many authors in support of his thesis. We suspect, however, that not all biochemists are in agreement as to the interpretations of their findings ; and it may be noted, from a clinical standpoint, that subgingival tartar does not seem to depend on saliva for its production, and that saliva is not a necessary factor in the production of enamel caries. Treatment seems to follow the usual lines, with the important addition of " a sufficiency of exercise to produce a normal supply of acid products and a diet carefully arranged to augment acid production, and a regulation of the daily life to bring about a balance in the intake-output equation." The essay is the result of much patient observation, and has brought its author a well-deserved reward.

[2] The Cartwright Prize Essay of the Royal College of Surgeons of England, 1926–30. By F. W. Broderick, M.R.C.S., L.R.C.P., L.D.S. London: John Bale, Sons and Danielsson, Ltd. (Pp. 88 ; 2 charts. 7s. 6d. net.)

CORONARY DISEASE

The volume entitled *Diseases of the Coronary Arteries (Myocarditis)*, by Sutton and Lueth,[3] has been very well produced, but its contents are disappointing. The first surprise is in the introduction, where the authors defend the use of the term " myocarditis," first on account of its long usage, and, secondly, on the ground that they have " accepted the thesis of Huchard ; *i.e.*, that the cardiac symptoms of chronic cardiovascular disease are the product of arteriosclerosis of the heart, which is synonymous with chronic myocarditis." If these are valid reasons (which is doubtful) they certainly bear little weight against the fact that myocarditis implies inflammation, and the fact that ischaemic fibrosis cannot be classed as an inflammatory process. But, apart from the initial handicap of its title, this volume bears the marks of slipshod construction ; further, the style is dogmatic and not always free from ambiguity. No information is given concerning the material from which the impressions are formed, beyond the reference to " a large group of patients " in the preface. While the impressions recorded by the authors are in the main orthodox, statistical analyses of their cases would have enhanced greatly the value of their work. References are made to an extensive bibliography ; this in itself is useful, but in certain sections—for example, on the pathology of coronary disease, and the pathogenesis of " chronic myocarditis "—the discussion is apt to fall into a cataloguing of names, dates, results, and views.

This monograph has been written " primarily with the view of its applicability to bedside practice." It might therefore be expected that the section on treatment would be comprehensive. The views expressed are sound in principle, but they are, like most of the book, sketchily presented; little help is thus afforded to those seeking guidance in details of therapeutics. It is a pity that the authors have allowed their work to take a form in which its value to the practitioner is slight, and its value to the cardiologist but little greater.

FAITH HEALING

Dr. A. Clarke Begg of Swansea has produced an admirable little book on *Faith Healing : Its Uses and Limitations*.[4] It is written from the point of view of an experienced, sensible medical practitioner of high standing who is at the same time a sincere and loyal churchman. The book is the outcome of a lecture, repeated to different audiences, clerical and lay, and now amplified to make a wider appeal, which should include, among others, members of the author's own profession. There is a short introduction by the Bishop of Monmouth, who says truly that Dr. Begg's " contribution to the discussion is distinguished by the scrupulous honesty with which he recognizes both the advantage of spiritual healing in its proper sphere and the dangers which may arise when the necessary precautions and limitations are ignored." The subject is approached, not from a contentious angle, but from one which is definitely critical. The author says nothing of an original or outstanding character, but his presentation of the case is not only marked by calmness and reverence, but is as full and clear and well arranged as it could be for the purpose which he has in view. After some very necessary definitions and a brief statement of the different ways in which psychotherapy, widely interpreted, may be effective in the treatment of disease, he considers the field which definitely offers scope for

[3] *Diseases of the Coronary Arteries (Myocarditis)*. By Don C. Sutton, M.S., M.D., and H. Lueth, Ph.D., M.D. London: H. Kimpton. 1932. (Pp. 164 ; 42 figures, 3 plates. 25s. net.)

[4] *Faith Healing : Its Uses and Limitations*. By A. Clarke Begg, O.B.E., M.D., Ch.B.Ed., M.B.Lond. With introduction by Gilbert Joyce, D.D. London: Longmans, Green and Co. 1932. (Pp. 94. 2s. 6d. net.)

faith healing, the limitations of that field, and the borderland area about which there may be some dispute ; he states the criteria that must be satisfied to establish a proof of cure ; and examines some systems of faith healing, including that of " spiritual or divine healing," which some of the clergy advocate and practise. What may be described as his peroration is an appeal for the establishment of proper relations and co-operation between the doctor and the priest or minister.

Dr. Begg has some effective phrases that serve to emphasize points which are often not given their due stress in discussions of this subject. For example, there is the statement that while a faith healer might not hesitate to attempt the cure of a congenital defect in the structure of the heart, he would probably refrain in the essentially similar cases of hare-lip and cleft-palate. Again, " If faith healing could succeed in curing all disease, which fortunately it cannot, old age would be even more to be dreaded than it is now " ; and " It must be remembered that a case which has resisted the ministrations of both a doctor and a spiritual healer may be cured by falling downstairs." Important, also, is the statement that " doctors are always accused of being sceptical about the beneficial results of faith healing, but they require only the same kind of proof in these cases as they do in cases treated by ordinary medical methods."

There appears to be, however, one flaw in the author's otherwise unimpeachable logic to which his attention may be directed, for unless it can be corrected or explained it may be held seriously to undermine his main argument about " spiritual healing." His consideration of the efficacy of prayer and its relation to physical disease is marked by the reverence and knowledge and common sense that are common to the whole book. His statement of the purely psychological grounds on which it may be effective may well be accepted. Moreover, the spiritual harmony which may be strengthened or restored by close and sincere communion with something outside one's self, the God of one's belief, cannot be doubted ; nor can the beneficial effect of such harmony in many cases be disputed. But when, going beyond this, he claims that " in true prayer there is a mystical value impossible to define," and that " the mystical power of this communion may assist recovery by reinforcing, in some indefinable manner, the ordinary methods of cure," is he entitled to resist very strongly, as he does, the claims which others make to the " mystical " value of the methods they practise?

Dr. Begg uses one simile which is intriguing. He says that a tired man suddenly attacked by a bull " runs like a lamplighter, and leaps with ease over a high fence to safety!" Why " like a lamplighter "? Have the lamplighters of Swansea these peculiar methods of progression, or is there some obscure confusion with lightning?

THE NEW PHARMACOPOEIA EPITOMIZED

Simultaneously with the publication of the *British Pharmacopoeia, 1932*, there appears a summary of the new issue, compiled by Mr. H. Wippell Gadd, barrister-at law, formerly a university lecturer on pharmacy.[5] In some preliminary tables the differences between the new edition and that of 1914 are set out. Three hundred or more articles and preparations which appeared in the earlier publication have dropped out, and some 120 others appear for the first time. There is also a long list of preparations, the names of which have been altered (although in most cases the old names are retained as synonyms), another list giving changes in composition, and a third, most important of all, giving changes in strength—for example, some preparations are now only half the strength given in the earlier work. The bulk of the synopsis consists of a table giving all the substances which appear in the official compilation, their character, and the imperial and metric doses, with certain other information useful in prescribing or dispensing, but not the details of the manufacturing processes or the chemical tests, for which the original work must be consulted. As an appendix there appears a useful summary of the law relating to poisons and of the Dangerous Drugs Acts. Those who practise medicine and pharmacy find it necessary to memorize certain parts of the *Pharmacopoeia*, and no more easy form of doing so or of making daily reference to its requirements can be imagined than this little volume. The *British Pharmacopoeia* itself, in spite of the enormous amount of detail it includes, is by no means unwieldy, but one cannot carry it about without being conscious of encumbrance, whereas this synopsis can be slipped conveniently into the waistcoat pocket and consulted with the utmost ease.

[5] *Synopsis of the British Pharmacopoeia.* Compiled by H. Wippell Gadd. London: Baillière, Tindall and Cox. 1932. (Pp. 189. 2s. 6d. net.)

Notes on Books

The second edition of the *Handbook of the Vaccine Treatment of Chronic Rheumatic Diseases*,[6] by Dr. H. Warren Crowe, follows the lines of its predecessor ; the text has been simplified in places. Still smaller doses are recommended. In confirmation of the claims put forward previously by the author as regards the success obtainable by this line of therapy, reports of 526 cases treated by general practitioners are summarized in an appendix, as a corollary to the reports of the Charterhouse and Brighton rheumatic clinics. The evidence so far obtained in favour of rheumatic diseases being of bacterial origin, and therefore likely to be remediable by vaccine therapy, is detailed, and Dr. Warren Crowe insists that his anticipation of good results has been fully justified. He emphasizes the point that his method of treatment is essentially a modification of a previously established one, and is not a new departure in rheumatic therapy.

A professor's life, according to Professor W. B. Cannon, can be indeed a happy one. So, at least, one gathers from a graceful little volume[7] which celebrates his tenure, during a quarter of a century, of the George Higginson chair of physiology at Harvard University. On October 15th, 1931, there was presented to the university a portrait of this distinguished investigator, who was represented at work in his laboratory—a portrait which, as he remarked, will be known not only as a likeness, but also as a glorification of the laboratory coat —and on that occasion some charming and affectionate tributes were paid to the subject of it. It was a happy thought to have these speeches, and Dr. Cannon's modest reply, printed, since he and his work are as sincerely admired in other countries as they are in his own. This pleasing little book will therefore be read with sincere approval by physiologists in other lands, and they will agree that the gratitude and affection expressed on the occasion with which it deals have been well deserved.

Ernest Benn's *Nursing Homes, 1932*,[8] contains comprehensive lists of nursing, convalescent, and mental homes in England, Scotland, and Wales. Primarily designed for the use of the nursing profession, the directory should be of real value to doctors wishing to ascertain the resources of a particular locality for the benefit of their patients. The arrangement facilitates quick reference, and telephone numbers as well as addresses are given.

[6] *Handbook of the Vaccine Treatment of Chronic Rheumatic Diseases.* By H. Warren Crowe, D.M., B.Ch.Oxon., M.R.C.S., L.R.C.P. Second edition. London: Milford, Oxford University Press. 1932. (Pp. viii + 79. 3s. 6d. net.)

[7] *Walter Bradford Cannon. Exercises Celebrating Twenty-five Years as George Higginson Professor of Physiology.* October 15th, 1931. Cambridge, Mass.: Harvard University Press ; London: Milford, Oxford University Press. 1932. (Pp. 94. 10s. 6d. net.)

[8] *Nursing Homes, 1932* (second year of publication). Edited by J. Eaton Hosking. London: Ernest Benn, Ltd. (Pp. 262. 3s. 6d.)

The manual on *Home Nursing*,[9] the authorized textbook on this subject of the St. John Ambulance Association, has just been completely revised for its fourth edition, and it ought to be a very popular little book. The subject-matter is presented in a thoroughly practical manner, and the revision has led to several improvements which should enhance its value. Simple terms are used in the main chapters, while a glossary of over thirty pages gives all the extra information that the "nurse" may require when she is attempting the professional's work in the home with the necessity of understanding the doctor's orders. This is certainly a book which ought to be more widely known than it is.

[9] *Home Nursing*. The authorized textbook of the St. John Ambulance Association. Fourth edition. London: The St. John Ambulance Association. 1932. (Pp. 272. 1s. 6d. net., post free 1s. 7½d.)

Preparations and Appliances

THE PROJECTION SCOTOMETER

Mr. N. Bishop Harman, F.R.C.S., writes: There are two principal methods of mapping the central area of the field of vision, including some 30 degrees about the fixation spot, so as to secure a record of the normal blind spot or any abnormal blind or partially blind areas, (*a*) by using a screen at a distance of a metre or more, or (*b*) at a short distance of some fifteen inches. The long-distance method offers greater accuracy of mapping, but in order to make recording easy a bulky instrument is necessary. If the instrument is not self-recording the process of transferring the map to a chart is so long and laborious as to fatigue the patient and defeat the aim of accuracy (Bjerrum screen). Short-distance instruments can be made self-recording (Bishop Harman instrument), and, with a record of the same size as the map, the method is very speedy. All these instruments rely upon opaque objects dependent upon the external illumination of the room, and with very different coefficients of reflection or scattering for the different colours. Another disadvantage is the necessity of some carrier for the test object, which may distract attention from the object itself.

The projection scotometer has three exceptional features: (1) both instrument and surgeon are behind the patient; (2) the instrument has no gearing or machinery; and (3) lighting can be uniform at all times. It consists of a stand with a main column and a branch arm, to which is attached a rest for the back of the patient's head, and an adjustable small mask to rest over the occluded eye. Two projection tubes are attached to the main column behind and to one side of the patient. One tube is fixed and projects a light in the shape of a cross as a fixation point upon the wall of the room or a screen; the other tube projects upon the wall a circular patch of light, whose size can be regulated by a series of diaphragms, and whose colour can be altered by a series of filters. This "object" tube can be rotated about a horizontal axis practically parallel to the axis of fixation, and can be inclined about an axis at right angles. The spot of light can thus be made to traverse a circle around the fixation spot, along any radius from it, or along any other path. The first movement corresponds to the rotation of a perimeter arc, the second to the movement of the perimeter object along the perimeter arc, and the third to a combination of both movements, generally rather difficult to carry out with other instruments. These movements cause no sound at all, and can be carried out with any required rapidity. Since the whole mechanism is behind the patient, he sees nothing but the two small lights—the fixation cross and the moving spot light—so there is nothing to distract his attention.

The recording is practically automatic. A small portion of the beam from the moving object tube is projected backwards from the main beam by means of a small prism. If the main beam is projected towards the wall 30 degrees upwards and 10 degrees to the right of the fixation axis, the small beam will be thrown back 30 degrees downwards and 10 degrees to the left of the fixation axis. The chart is placed upside down in a holder upon a plate of plane glass. The small beam thrown backwards is focused upon the chart by the instrument so that a small dot of light is seen shining through the chart at a point corresponding exactly to that occupied by the object light. This position can be recorded by a pencil point.

Before taking an observation with the instrument, the object projection tube should be set so that when it is rotated the object disk of light does not move—that is, its normal axis is set. The fixation cross should then be adjusted by means of the adjusting screws, so that it coincides with the object disk of light. The apertures are such as to project patches of light subtending to the patient's eye at 2 metres, the normal working distance of the instrument, 5′, 10′, 20′, 30′, 45′, and 60′. There is a clear aperture in the filter wheel to give a bright white patch, and a series of three—red, green, and white—of lower intensity, but equal one to the other. The head rest and projectors can be raised or lowered together.

To set the chart holder a chart should be inserted and the projector tube moved so that the disk of light coincides with the fixation cross of light. A thumbscrew under the chart holder can be loosened, and the chart holder moved vertically or horizontally, so that the cross of light coincides with the centre of the chart. It is necessary in setting up the instrument that the chart holder should be parallel to the screen of projection, at least to the accuracy of the judgement of one's own eye test. A click device can be brought into action if required to mark 15 degree meridians. There is a device on the mask that rests over the patient's forehead carrying the occlusion disk. A small tube projects through the mask, with two swinging covers, either of which can be brought into position; the one completely occludes, and the other has a small pin-hole. If the examined eye has a central scotoma and the other eye has good central vision, placing the pin-hole cover before the good eye will allow it to see the fixation spot and a very small area surrounding it. In most cases this "fixing" of the one eye will cause the other eye to maintain a fixed direction, so that its field can be mapped out. The instrument is made by Messrs. Rayner of 100, New Bond Street, London, W.1.

Rhinological Mirror

Mr. C. de W. Gibb, F.R.C.S.Ed. (Torquay), writes: The mirrors I use for the examination of the roof of the naris are made by Messrs. Mayer and Phelps, and are of the pattern of StClair Thomson's post-nasal mirror; they range in diameter from 10 mm. downwards. The one which I find most generally useful is the 8 mm. size, and it is placed between the blades of a previously inserted Thudichum nasal speculum.

Halibut-liver Oil with Viosterol

Messrs. Parke, Davis and Co. announce the introduction of "haliverol," a halibut-liver oil extracted by a special process and fortified by the addition of irradiated ergosterol (viosterol). It contains sixty times as much vitamin A as cod-liver oil, and the vitamin D content is adjusted to 250 times that of cod-liver oil. As its potency is such that 1 minim contains the vitamins A and D equivalent to 1 teaspoonful of cod-liver oil, the dose is in drops instead of teaspoonfuls. Haliverol is supplied in bottles of 5 c.cm., provided with a dropper, and in soft gelatin capsules, each containing 3 minims.

PREGNANCY DIAGNOSIS STATION

REPORT ON THIRD YEAR'S WORKING

BY

B. P. WIESNER

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The second report[1] on the working of the Pregnancy Diagnosis Station, which was, like the first,[2] published in this *Journal*, dealt with the cases diagnosed up to the end of January, 1931. The present report embodies the cases dealt with up to the end of January, 1932. As in previous reports, only cases submitted by practitioners, hospitals, or public health authorities are considered.

Technique

No alteration in the technique has been introduced in the year of the report. The treatment of the urine with sulphosalicylic acid has been continued, and has given satisfactory results, so that only one case remained undiagnosed because of toxicity of the sample.

Results

In all, 1,477 cases have been dealt with in the period of the report (as against 840 cases in the first and 835 in the second year of the working of the station); 824 cases have so far been controlled by clinical diagnosis. In 96.61 per cent. the diagnosis as arrived at by the test was confirmed clinically. In 3.39 per cent. the diagnosis differed from that given by the station. Yet, as in previous reports, it must be emphasized that the latter figure cannot be regarded as the real error of the method. A positive reaction may be obtained in the absence of a living foetus when other living products of conception are still present, as well as under other conditions enumerated in previous reports. On the other hand, a negative test may be obtained in the presence of clinical signs of pregnancy when the secretory products of conception have died although expulsion of the foetus has not yet occurred. Considering these facts the "real" error of the method during the third year was 2.67 per cent. (as against 2.41 per cent. in the second year). This figure can be regarded as generally correct if it be assumed that the proportion of errors in the whole group of tests is the same as in those tests which were actually controlled by clinical diagnosis. This seems probable, but no definite conclusion can be arrived at until all clients of the station agree to fulfil the request of the station to send information regarding the ultimate diagnosis.

Attention was drawn in the last report to cases where the test gave a negative result while clinical symptoms made the existence of pregnancy probable. It was reported that in a number of such cases pregnancy was terminated by abortion. This year's material again contains instances of such cases. As mentioned in a previous report, the prognosis for uneventful termination of pregnancy does not seem to be very favourable in cases where a negative diagnosis was returned although clinical symptoms indicated existence of pregnancy. It may be that future findings will suggest a definite clinical basis for the application of a possible method for the prevention of abortion, which has been referred to elsewhere,[3] and which might be submitted to a more extensive clinical trial by being applied to the cases under discussion.

Friedmann Test

The station now accepts samples for diagnosis by a test which represents a modification of the original Friedmann test. For this test rabbits are injected with a preparation made from the sample of urine by a method described elsewhere,[4] and the diagnosis can be given within twenty-four to thirty-six hours. In most cases an even more rapid diagnosis is possible (with a lower degree of reliability). A full report on the results will be given in due course when a sufficient number of cases have been treated and controlled by clinical diagnosis. At present it appears that the test is not as reliable as the original Aschheim-Zondek reaction; yet in cases where a positive diagnosis has been returned the latter may be regarded with confidence. In all cases where a rapid test is demanded by the sender part of the sample is retained for an Aschheim-Zondek test. If the rapid test is negative, while the Aschheim-Zondek reaction gives a positive result, the latter should be regarded as decisive.

Fees

The fees charged by the station for the Aschheim-Zondek test are 10s. for cases sent by private practitioners and 3s. for cases from hospitals or public institutions. The fees charged for the rapid test are £1 10s. for cases from private practitioners and £1 1s. for cases sent by hospitals or public institutions. The fees for the rapid test cover the expenses for telegraphic information and the Aschheim-Zondek test carried out with every sample, along with the rabbit test.

The fees charged serve solely to cover the expenses of the station, which will continue its work, being financially secured against deficit by a guarantee from the Medical Research Council. Thanks are also due to the latter for a grant which covered the expenses of the preliminary experiments necessary before the adoption of the rabbit test.

Careful packing of the specimen is essential, and the name and address of the doctor should be put on the parcel. It has occurred on several occasions that parcels were destroyed by the Post Office (in accordance with its regulations) when the bottle containing the sample was broken, so that fluid escaped. In several such cases the station was unable to trace the sender. It is therefore particularly requested that details regarding the case, and the name of the sender, should be forwarded to the station under separate cover, and that the fee accompany this information in order to save unnecessary expenditure and work.

[1] *British Medical Journal*, 1931, i, 860.
[2] Ibid., 1930, i, 662.
[3] *Lancet*, September 3rd, 1932, p. 509.
[4] *Quart. Journ. Exper. Physiol.*, 1931, No. 2, xxi, 147.

ROYAL MEDICAL BENEVOLENT FUND

At the September meeting the committee of the Fund voted sixty-nine grants amounting to £1,421 5s., as compared with thirty-four grants amounting to £577 10s. at the corresponding meeting in 1931. The increasing number of cases, and the necessity of helping the many applicants who are known to be deserving and in great financial difficulties, render the appeal for support of the Fund the more urgent by those who have not yet subscribed. Cheques should be made payable to the Honorary Treasurer, Royal Medical Benevolent Fund, 11, Chandos Street, Cavendish Square, London, W.1.

The following are particulars of a few cases helped.

Widow, aged 65, of M.R.C.S., L.R.C.P. Since the death of her husband in 1906 had enjoyed an income of £250 per annum paid from money left in trust. The trustee, who had entire control of the trust, has proved to be fraudulent, and is now in gaol. The widow's income has therefore suddenly and unexpectedly stopped, as all securities have disappeared, and she is left penniless. Fund voted special gift of £20, and £26 payable in four instalments over one year.

Widow, aged 36, of M.R.C.S., L.R.C.P., who died at the age of 38, leaving widow with a yearly income of £33 and three children, aged 6, 4, and 2, to maintain and educate. The husband had a distinguished war service, received the D.S.O. for outstanding courage, and paid for his medical education from what he received from the war. He was working as a medical officer on a salary of £500 per annum, which was eaten up in the simple necessities of life. By his early death from phthisis his widow and three young children are left without means of support. Fund voted a special gift of £20, and £26 payable in four instalments over a period of one year.

M.R.C.S., L.R.C.P., aged 71, has worked as a ship surgeon. He is now totally incapacitated from tuberculous glands in the neck and arthritis. His wife is an incurable lunatic, and has been in an asylum for the last forty years. Applicant's income was £96 per annum. He is obliged to employ help in dressing, walking, and general needs. Fund voted £40 in four instalments over a period of one year.

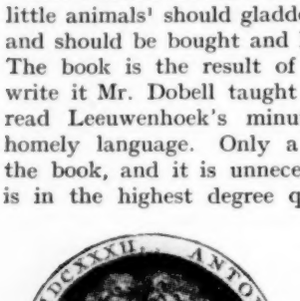
The Ladies' Guild of the Royal Medical Benevolent Fund still receives many applications for clothing, especially for coats and skirts for ladies and girls holding secretarial posts, and suits for working boys. The Guild appeals for second-hand clothes and household articles. The gifts should be sent to the Secretary of the Guild, Tavistock House (North), Tavistock Square, W.C.1.

Nova et Vetera

TERCENTENARY OF LEEUWENHOEK

Antony Van Leeuwenhoek, the Dutch microscopist, was born at Delft on October 24th, 1632, four days after the birth of Christopher Wren, and died at his native place on August 26th, 1723, exactly six months after the death of Wren.

Mr. Clifford Dobell's account of Leeuwenhoek and his little animals[1] should gladden the heart of every biologist, and should be bought and kept as a treasured possession. The book is the result of twenty years' labour, and to write it Mr. Dobell taught himself Dutch, and learnt to read Leeuwenhoek's minute writing and interpret his homely language. Only a biologist could have written the book, and it is unnecessary to say that Mr. Dobell is in the highest degree qualified for the purpose. He introduces his subject with a sprightly and wholly unnecessarily apologetic preface; dedicates it to Professor D'Arcy Thompson and Paul de Kruif in words which we forbear to translate in view of the penalties threatened for those who dare to do so; and issues it on the three hundreth anniversary of Leeuwenhoek's birth.



The detailed account of Leeuwenhoek is delightful. It shows him as a well-to-do mercer holding municipal office in Delft, where he lived his whole life, ignorant of any language but his own, speaking and writing the local patois. With a scientific and experimental spirit of the highest order, he had indomitable perseverance, and was seemingly possessed of the keenest eyesight. He lived to be 90 years, 10 months, and 2 days, continued to work almost to the end, and felt somewhat aggrieved at the reputation he had gained because his work was constantly interrupted by the distinguished visitors who came to see him. He was elected a Fellow of the Royal Society on January 29th, 1679/80, and from that time onwards was in constant communication with it. Mr. Dobell tells of all this, chastising those who have written of his hero without sufficient knowledge, correcting their mistakes and praising the few who, like himself, have gone to original sources for their information. He illustrates his story with many pictures, which are well reproduced, but we would give all of them if Vermeer had painted one showing Leeuwenhoek at work as Trembley was depicted some twenty years later. But alas! Vermeer was long dead, and we are left to imagine the scene.

Mr. Dobell has been able to identify many of the protozoa and other minute organisms which Leeuwenhoek described with astonishing accuracy. Volvox, vorticella, and the larger ciliata anyone might have observed, but it is startling to find that he recognized such minute bodies as selenomonas and leptothrix, and that he had some knowledge of the anaerobic bacteria. His microscopes were of the simplest, and his methods of preparation were crude. Mr. Dobell throws out the very plausible suggestion that Leeuwenhoek, in the course of his experiments, had found some simple method of dark-ground illumination. If this were so, it would explain all his otherwise inexplicable observations. But, as has been said, the book is a treasure to be possessed, read, and re-read by everyone who is interested in the history of seventeenth century science.

[1] *Antony Van Leeuwenhoek and His "Little Animals."* Being some account of the Father of Protozoology and Bacteriology and his multifarious discoveries in these disciplines. Collected, translated, and edited, from his printed works, unpublished manuscripts, and contemporary records by Clifford Dobell, F.R.S. London: John Bale, Sons and Danielsson, Ltd. 1932. (Pp. vii + 435; 32 plates. 31s. 6d. net.)

THE INCIDENCE OF DENTAL DISEASES IN ANCIENT EGYPT*

BY

PROFESSOR G. ELLIOT SMITH, M.D., F.R.S.

Since 1910 new information has come into my possession which necessitates the modification of the commentary I made in the report of the Archaeological Survey of Nubia. In December, 1911, during the course of a visit to Egypt to wind up the affairs of the Nubian Survey, I had the opportunity at Sakkara of examining a series of important skeletons dating from the close of the second and the beginning of the third dynasties. The full account of the observations made during this mission will be found in the report of the British Association for the Advancement of Science, 1914, p. 212.

This material included the first definite evidence of the earliest date of the coming of alien people into Egypt, but these people were very few in number. The important bearing of this point on the condition of the teeth is this—that in spite of the fact that the people of the early part of the third dynasty were living during a period of comparatively high civilization and probably luxury, dental caries was almost as rare as it was in the predynastic period; and that alveolar abscesses following on the precocious wearing down of the teeth with exposure of the pulp were also as common as they were in the earlier period. It was only when this alien population became more numerous in the third, fourth, and fifth dynasties that dental caries became extremely common; so common, in fact, as to suggest that the alien people belonging to the so-called Alpine race were more susceptible to caries than the indigenous people of Mediterranean race.

To sum up the evidence from Egypt, it can be said that among the predynastic and early dynastic Egyptians dental caries was extremely rare, but alveolar abscesses due to the wearing down of the teeth (from the admixture of sand with food) was extremely common. Suddenly in the Pyramid Age in Lower Egypt, when a *large number* of alien people of so-called Alpine (Armenoid) race had come into Egypt, dental caries in the adult population became so common that more than 80 per cent. of the people had caries, often in extreme forms. A remarkable fact is that the deciduous teeth were wholly immune from caries. In fact it was not until the fifth century of the Christian era that caries made itself manifest in the deciduous teeth.

The statement of the new evidence is contained in the report of the British Association for 1914, to which reference has already been made, and the general conclusions have been discussed several times—for example, in a book called *Egyptian Mummies*, by G. Elliot Smith and W. R. Dawson, 1924, and also in an introduction which I wrote to a book by Cyril Bryan called *The Papyrus Ebers* in 1930.

* Communicated to the Section of Comparative Medicine, Centenary Meeting, British Medical Association, London, 1932.

British Medical Journal

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THE HARVEIAN ORATION

The fact that the ingenuity of a long succession of those who have delivered the Harveian Oration before the Royal College of Physicians of London has enabled each of them to direct his discourse in the main to the particular branch of medicine in which he was himself interested, and yet to maintain a reasonable degree of relevancy to the occasion, is a high testimony to the fundamental nature and value of the work and discoveries of William Harvey. These were indeed revolutionary, completely changing the whole of man's outlook over a very wide field. We are told that Sir Thomas Browne preferred Harvey's discovery of the circulation of the blood to the discovery of America. Such a delightfully useless comparison at least indicates the magnitude of the achievement. "He it was who opened wide for the science of Medicine the gates of the Renaissance and revealed, like Copernicus, a new orientation of human thought."

Sir George Newman, in his turn, in preparing the Oration of which we give an abstract this week at page 739, can have experienced little difficulty in connecting the work of Harvey with the progress of preventive medicine, and when in his title he adds to "the debt of preventive medicine to Harvey" its debt to the College of Physicians he has material for a pageant such as suits his artistry and such as his audience has learned to expect and appreciate. This conjunction of the two debts, to the person and to the College, is quite legitimate. Harvey "rendered the College of Physicians manifold services for half a century and left it precious legacies and benefits," and he took a personal part in some of the early consultations of the College by the City of London, the Privy Council, and Parliament with regard to the administration of public health measures, and in some of the inspections or investigations to which they gave rise. There can be little doubt that, though Harvey did not formulate, or even foresee, the consequences and developments of his discoveries, he must have been aware that momentous developments would follow, and may have dreamed of the directions along which some of these would proceed.

Over and above the value of his review of the activities of Harvey and of his College in the sphere of preventive medicine Sir George Newman has performed a service in extracting and emphasizing the fundamental facts of Harvey's discoveries in their relation to the conservation of health; and in stating clearly the essential principles which must govern that relation between the State on the one hand, and the individual members of the medical profession and organizations within the profession on the other hand, which has developed as a consequence of the increased attention devoted to communal health as part of the social evolution of our time. The discovery of the fact, and of the nature, of the circulation of the blood immediately necessitated a new idea of the physical nature of man. It led directly to the conception of physiological balance, and to a recognition of the circumstance that, though the organism has to live in a variable external environment, it must maintain stable and constant conditions of life in its internal vital mechanisms if it is to continue a healthy existence. It was Claude Bernard who most clearly formulated this conception, and the extent to which it has been realized and developed during the last half-century is common knowledge. The attention of the medical profession is being directed in larger and larger measure to the preservation of this balance—the maintenance of a healthy internal environment; and a physiological and biological approach to the study of health is likely to have an increasing place both in education for the profession of medicine and in its practice as contrasted with a pathological approach to the study of disease. Again, the relation of the circulation of the blood to infection was manifest to, and stated by, Harvey himself. The effect of this new knowledge, especially since the discovery of causal pathogenic organisms and their products, has, in Sir George Newman's words, led to a "mighty movement which changed the whole situation" relating to the treatment, control, and prevention of epidemic and infective disease. In this field modern clinical medicine is becoming increasingly prophylactic.

Alongside private medical practice tending more and more to take on the character indicated, there has grown up a communal medical service which, first concerned with the external environmental conditions and with the control of epidemic disease, and having tackled these with a great measure of success, is now turning its attention to the internal environment and the preservation of the health of the individual. Here is opportunity for a great clash, or for wide overlapping of function, or for both. Sir George Newman says that "the practice of medicine must always remain both inductive and individualistic." Applying this dictum to preventive medicine, the present situation (in which the clash and the overlapping are already manifest in some degree) may be yet transformed so that the "Public Health Service," as it is now known, will not usurp the functions more properly and effectively performed by the private practitioners, yet in such a way that the latter may be in intimate relation with, may, indeed, be an integral part of a communal health or medical service. The principles that must govern such co-operation or such amalgamation of service are of vast importance. With the four which Sir George Newman lays down there will be no quarrel. As he says, "There is nothing here which in principle departs from the primary and paramount benefit of the patient or invades the reasonable prerogatives of the physician." Nor need there be any

hesitation in accepting his illustration of the English health insurance system as indicating the general lines on which advance should be made. Some early consideration of definite proposals for development should, however, be begun in order that "the integrity and good will of the healing art may be maintained, and that the patient, be he rich or poor, may receive the full advantages of the science and art of medicine."

MORTALITY IN THE MERCANTILE MARINE

The measurement of risks to health peculiar to particular occupations is a field of vital statistics in which the difficulty of acquiring reliable data is, perhaps, at its maximum, and nowhere is more caution demanded in the interpretation of results. Not only is there the problem to be solved of securing an accurate measure both of the population exposed to risk over any period of time and of the deaths relating to this population, but the intricacies of "selection" are also involved. Entrants to an occupation often choose that occupation for reasons of health or because of the demands it makes upon physical strength; for the same reasons there is a drift from "heavy" occupations to "light" upon the part of the disabled. These factors, whose influence it is sometimes impossible to assess, are more apparent in the statistics of the health of the mercantile marine than in any other occupation. Yet, representing one of our most important commercial undertakings, it deserves particular attention, and cannot be neglected on account of the difficulties that have to be faced. The Registrar-General of England and Wales made an attempt to deal with it in an appendix to his *Decennial Supplement on Occupational Mortality, 1921*, but, as was pointed out in that report, the special frequency of change of the seaman's occupation affords special opportunity for discrepancy between the census and the death registration data upon which the Registrar-General had to depend, and his conclusions can, it is admitted, only be accepted with considerable reserve. Recently a careful attempt has been made to reach more dependable conclusions. The Joint Advisory Committee of the Board of Trade and the Ministry of Health, which was appointed to advise the two Departments on questions affecting the health of the mercantile marine, decided that a thorough statistical investigation of the mortality of merchant seamen should be undertaken. Arrangements were made with the London School of Hygiene and Tropical Medicine to carry out this investigation on behalf of the Board of Trade, and a report has been prepared by Major P. Granville Edge of the Division of Epidemiology and Vital Statistics.[1]

As usual great difficulty has been experienced in reaching a measure of the population exposed to risk; the annual census taken by the Board of Trade only refers to seamen employed on a given day, and must therefore give an exaggerated picture of the mortality experience, since the deaths relate both to the employed and the unemployed. In the absence of figures derived from the general census of 1931, which were not available at the time of the investigation, various hypotheses have had to be made. As regards the deaths, each certificate has been subjected to close scrutiny, and has been related to information from various other sources—official registers of seamen, information from the next-of-kin—which has shown whether the death might properly be regarded as that of a "seaman." Out of 4,326 deaths reported during the year's inquiry by the Registrar-Generals of Great Britain 16 per cent. were excluded as not really relating to seamen in the sense of the inquiry—for example, they had reference to men whose service had been confined to fishing vessels, barges, or other craft whose populations would not have been included in the annual census of seamen. Relating the remaining deaths to the population assessed gives a death rate for seamen of 16.04 per 1,000 at ages 20 and over, and 9.87 per 1,000 if the ages be confined to 20 to 65. The corresponding mortality rates for all males in England and Wales in 1929 were 17.61 and 9.70. But, as the report points out, apart from possible objections to the conjectures made in assessing the population, little importance can be attached to these crude rates as an indication of the healthiness of the mercantile marine as an occupation. The age distribution of merchant seamen differs too widely from that of the general population. A more appropriate standard of comparison is, perhaps, the Royal Navy, though even in this case there are widely differing conditions of service. An attempt at such a comparison leads to the conclusion that there is no evidence of excessive mortality in the mercantile marine, either from all causes of death or from disease. "Drowning" and "heart diseases" both appear as more frequent causes of death among British merchant seamen, but mortality rates from phthisis and cancer are actually below those reported for 1929 in the Navy.

The causes of death in the mercantile marine are also compared with those found in certain shore occupations which require a fairly high standard of physical fitness on the part of the workers employed—for example, coal miners. In the absence of any secure knowledge of the "exposed to risk" in the various age groups the method of proportionate mortality has been adopted. The general result reached—with this method it must necessarily be very tentative—is that service in the mercantile marine is, on the whole, no more dangerous to health than are many shore occupations frequently regarded as healthful. This is an important conclusion, relating as it does to one of our greatest industries, in which our knowledge of the health of the workers is extremely slight. But in view of the inadequacy of the data that still exists it must not be regarded as more than a suggestion from the available figures. None of the interesting and suggestive facts that Major Edge has brought to light can be regarded, as he himself says, as "definitive and final pronouncements." We

[1] Statistics Relating to Mortality in the Mercantile Marine. Report of the London School of Hygiene and Tropical Medicine. H.M. Stationery Office. (Pp. 98. 1s. 6d.)

are still too much in the field of conjectures. Major Edge urges a much more comprehensive inquiry involving the collection of data over a more extended period of time than the single year of the present investigation. Such figures, related to the more accurate population that the census of last year will provide, should prove whether the advances in preventive medicine, the standard of living, and sanitation that are apparent on shore have contributed equally to the health of the merchant seamen.

IMMUNE SERUM AND POLIOMYELITIS

The correspondence which has followed the leading article on poliomyelitis in our issue of September 10th is evidence of the interest which this subject rightly holds for the profession. It is well known that the disease shows a marked seasonal variation, and that its incidence is at its height in the autumn. Indications are not lacking, however, that the present increase of cases in this country cannot be wholly explained by this fact, and that there is now a mild epidemic in the British Isles. Experience has shown that severe epidemics are often preceded in the immediately antecedent years by a similar increase in the autumnal crop of cases, and it therefore seems justifiable to regard the present outbreak as a possible forerunner of something worse. That the interest felt in this country is shared abroad is well shown by the publication in the *Journal of the American Medical Association* for September 24th of five articles on poliomyelitis. Reference is made to the early symptoms and signs of the pre-paralytic stage of the disease, which we have already discussed. Three papers by Park, Laidlaw, and Levinson are largely devoted to the merit of treatment by human immune serum. The remarkable uniformity of opinion expressed by previous workers as to the beneficial results of serum, judged from the clinical standpoint, is confirmed by Laidlaw and Levinson. Great difficulty, however, has been experienced in securing well-controlled statistics. Kramer and Aycock, attempting to obtain such figures, studied eighty-two cases of pre-paralytic poliomyelitis at Brooklyn and Hartford Hospitals in a generally mild epidemic in 1931. Of the total cases treated with serum the average paralysis was 12.1, and of the untreated cases 5.9. The authors attribute these figures to the fact that there were five severely paralytic cases among the treated series, and state: "We failed to obtain statistical evidence that serum is effective, but it is not possible to draw the reverse conclusion—namely, that serum is of no value. While no conclusion can be drawn as to the efficacy of serum, the outcome of the study justifies its continuation on a larger scale." In the 1931 outbreak in New York similarly controlled figures were compiled by Park in a series of 927 cases, and no significant difference between the incidence of paralysis in treated and untreated cases was found. But the author states: "At first it was decided to treat alternate cases at the hospital, but it soon became evident that the great majority of those in the pre-paralytic stage staying at home were receiving serum, so as we had grave doubts as to the value of the serum and wished to have an equal number of controls, we stopped using it in the hospital." Thus the majority of cases treated with serum remained in their homes, and the majority of those not so treated had the advantage of being in hospital. Both these observations fall short of the ideal of a scientifically controlled experiment, the former through the inadequate numbers which allow five severe cases to influence the figures unduly, the latter through the presence of more than one variable factor. In determining his treatment of the disease, the practitioner will probably prefer to trust the consensus of clinical opinion rather than the evidence of two sets of statistics open to some criticism; but it is to be hoped that in the near future the results of a large series of cases treated under exactly similar conditions with and without serum may be available. Incidentally, the successful production of immunity in monkeys by means of the simultaneous injection of virus *and* immune serum[1] is of considerable interest. Here again, however, results have been variable, and further experimental work is called for.

A DIETARY PRINCIPLE STIMULATING GROWTH AND LACTATION

Dr. L. W. Mapson, working in the Biochemical and Dunn Nutritional Laboratories at Cambridge, has discovered a substance in fresh ox-liver which definitely increases the growth of rats, especially male rats. His discovery arose out of an inquiry into the advantages or disadvantages of liver therapy in supplying the nutritional requirements of a growing mammal. Osborne and Mendel had shown in 1926 that stock rats grew much faster if 1 gram of fresh liver or 40 grams of fresh lettuce were added to their daily diet, even though the diet was already amply supplied with vitamins A, B, and D. This influence of fresh liver appears to be vastly greater than had been previously supposed. Dr. Mapson[2] has recently carried out a series of investigations on white and piebald rats, giving them a basal diet composed of rice starch, 40 parts by weight; light white cassein (B.D.H.), 23 parts; cane sugar, 17 parts; palm kernel oil, 15 parts; salt mixture, 5 parts; cod-liver oil, 30 parts; wheat germ, 10 parts; and dried yeast, 8 parts. The liver used was obtained fresh from the abattoir, and each rat was given from 0.5 to 1 gram of fresh liver a day. The minimum dose capable of giving the maximum effect has not yet been determined. A marked acceleration of growth was usually apparent at once and lasted for a period of five to six weeks. The animals appeared larger than the controls in every way, and necropsy showed no significant increase of fat to account for the change in weight. The increase in the females, however, was much less marked, and was only just outside the individual variation among the controls. The older the animal the less chance there was of obtaining this response, and the obvious corollary was that it might be possible to transmit the growth factor through the parents. This was in fact done. The mothers received 1 gram of fresh liver daily through the preliminary period and about double this during lactation; the fathers received 0.5 gram of liver each day. The young were given no liver at all; they were allowed plenty of milk for five weeks after birth, but otherwise they only had the standard diet. There was no difference between the birth weight of the

[1] Flexner, S.: *Journ. Amer. Med. Assoc.*, October 8th, 1932.
[2] *Biochemical Journal*, 1932, xxvi, No. 4, 970.

treated and of the control group, and no significant difference appeared until the third week ; after this, however, the curves rapidly diverged and the offspring from liver-fed parents grew much more quickly than the controls. Since young rats begin eating for themselves at about twenty-one days the appearance of the growth response corresponded with weaning. The period of acceleration was longer among rats whose mothers received liver than among rats who received it themselves: a liver-fed rat would be slightly heavier than a control rat, but a rat whose mother had had liver might be 70 to 100 grams heavier than the control rat. In the second generation the growth rate was practically identical with that of the controls. It also appeared that the litters of the liver-fed animals are much larger, the average being 10.3 as against 7. Quite often a rat fed on a synthetic diet was unable to rear her young, but no failure of lactation occurred when liver was added to the diet. The suggestion naturally arose that the result might be due to the manganese present in the liver, but the difference between the manganese present in the diets of liver-fed and control animals was only of the order of 0.01 mg., and an increase in the manganese content of the diet produced no beneficial effect among the controls. The diets were carefully investigated to make sure that the increasing growth was not due to any of the known vitamins, and wheat germ was also added to differentiate the new liver factor from the Coward factor. Fractionation experiments showed that the substance was not a protein, though it may be a protein degradation product. It is extracted from fresh liver by 90 per cent. alcohol. It appears, therefore, that fresh liver contains a substance capable of augmenting normal physiological growth in young rats and also of stimulating lactating power. Possibly it acts by stimulating the anterior lobe of the pituitary gland, but at present its nature and mode of action remain obscure. Physicians who wish to make clinical experiments on human lactation can obtain the extract used by Dr. Mapson from the British Drug Houses Ltd. In the meantime Dr. Mapson is continuing his work on the growth factor, which he has called " physin."

RADIANT HEAT AND HUMAN COMFORT

Numerous schemes for radiant heating have been developed in recent years, and great claims have been made for their efficacy, but owing to lack of suitable methods it has been very difficult to test and compare them. In a paper read before the Institution of Heating and Ventilating Engineers,[1] Dr. H. M. Vernon described an instrument, called the globe thermometer, by means of which a measure of the radiation from any system in relation to its influence on human comfort can be easily obtained. The globe thermometer consists of a six-inch black-painted copper globe with an ordinary thermometer fixed so that its bulb is at the centre. Radiations from all sources falling on the globe surface are summated by this central thermometer, and the temperature indicated by it—in excess of the air temperature—is a measure of the radiation which would warm the human body. For instance, the subjects of experiment felt " comfortably warm " if they were seated in a room at an air temperature of 49° F. and were exposed to radiant heat which induced an excess temperature of 13° in the globe thermometer. The combined temperature to which they were exposed was therefore 49° plus 13°, or 62°, and it was found that any combination of air temperature and radiation temperature which added up to 62°, whether induced by gas-fire heating, stove heating, or ceiling panels, equally produced a state of comfortable warmth in the subjects, under still-air conditions. A comparison of various systems of radiant heating showed that gas-fire heating gave by far the largest amount of radiant heat, that from anthracite stoves—when tested at the same distance—being only a quarter to a half as much, and that from hot-water radiators a tenth as much. The ceiling panel system, in which the panels are heated to about 100° F. by hot water or electricity, yields a very mild form of radiation, and it is suggested that the most desirable and pleasant form of heating may ultimately be found to consist in ceiling panels, with their radiation augmented at certain localized positions in the room by other means—for example, small electric heaters. Rooms warmed solely by gas fires are generally considered to suffer from too much radiant heat.

[1] The Measurement, in Relation to Human Comfort, of the Radiation Produced by Various Heating Systems. By H. M. Vernon. *Proceedings of the Institution of Heating and Ventilating Engineers*, October 4th, 1932. See also *Domestic Engineering*, October, 1932.

X-RAY TUBES FOR INTERNAL USE

The idea of constructing an *x*-ray generator small enough to be introduced into body cavities is, like most apparent *x*-ray innovations, no new thing. Cavity tubes were made twenty-five years ago, but fell into disuse for several important reasons. As the rays were unfiltered, the healthy and unhealthy tissues were alike badly damaged ; moreover, in many tubes the glass applicator, which served as the anti-cathode, was not cooled in any way, and soon reached an unbearable temperature. These defects have now been largely overcome, and several tubes have been constructed for cavitary therapy which theoretically should be fairly harmless and of considerable value. It is obvious that it is better to apply therapeutic radiation as exclusively as possible to a malignant growth and to spare the surrounding tissues ; leaving aside the question of the efficacy of medium-hard *x* rays as compared with that of radium rays, an *x*-ray tube should have the advantage over the radium applicator that its energy can, within limits, be directed where desired. The British Thomson-Houston Company is the assignee of a tube patented by Coolidge, of which an abridged specification appeared in the *British Journal of Radiology* for August, 1932 (p. 672). The cathode wire, as is necessary in such apparatus in order to obtain a fine focus, is very small, and is enclosed in a focusing cup mounted within a fairly large metal cylinder. This tapers to a small metal cylinder of suitable length, at the end of which is placed a heavy anode carrying a target set at 45 degrees. The rays, which come off roughly at right angles to the tube, are filtered through a window of chrome nickel steel. The tube is cooled by water circulating in a small copper pipe, which is soldered round it. No news is to hand about the behaviour of this apparatus in practice, but a similar device made by the Siemens Company has been tried in Germany, and a report was published by Drs. W. Schaefer and E.

Witte in *Strahlentherapie* for June (p. 283). It is very similar in design to a tube used by Dr. Schaefer for generating cathode rays, but the end is closed by a nickel plate 0.4 mm. thick, which stops all the electrons and generates *x* rays. The body of this tube is of glass, and the anode is represented by the whole of the cavitary applicator and its tubular extension into the glass body. The applicator is cooled by a water-jacket, and filters of varying design can be fitted to the end in order to vary the direction and shape of the cone of radiations. The anode is connected to earth, a precaution which prevents the use of very high potentials—the tube has been operated at 100 kV with 4 mA. For clinical use the tube is mounted on a wheeled stand with an arrangement for adjusting its height and direction. A speculum is inserted into the vagina and the open end brought into contact with the field to be irradiated; this instrument is made to fit round the tube, and its opening corresponds to the filter which is to be used. The tube is then inserted and the dose given. The authors say that all the patients have tolerated this form of irradiation very well and that no burns have been seen. A white scab similar to that produced by radium is observed after a time on the surface of the tumour. They consider it particularly useful for applying large doses to the parametria and the pelvic wall, where metastases are especially apt to grow, and which it is almost impossible to treat adequately with radium. If such devices prove safe in action, and it is possible to stop the side-scattering which seems at first glance likely to take place, they ought to do work which no other device can do. Unfortunately, as with all apparatus for treating malignant growths, their value cannot be assessed for a number of years.

DIAGNOSIS OF HYDATID DISEASE

A recent monograph by Pinelli[1] on the biological diagnosis of hydatid disease has been written to acquaint practitioners in Sardinia, the part of Italy where the disease is most common, with modern laboratory methods. The book will, however, have a much wider appeal, for the author has included the results of observers not only in Italy, where the first investigations of the complement-fixation reaction and intradermal tests for hydatid disease were made, but also in other countries where the disease is endemic. The bibliography contains references to papers from France, Germany, Iceland, Australia, and the Argentine. These have been annotated, while the various modifications of technique used by different workers are discussed critically and with judgement. We have here no mere compilation, but a book which will prove both a reliable guide to all seeking information on the subject and a source of much interest and value to others who have worked on these problems. In cases of hydatid disease of liver or lung—the commonest sites of infestation—the symptoms are so often indefinite and the cysts so deep-seated as to elude recognition on ordinary physical examination. Other methods thus have to be used. *X* rays are valuable, but in the case of a living parasite the biological reactions of the host are especially valuable. There is frequently an increase of the eosinophilic leucocytes of the blood, while a precipitin reaction occurs in the patient's serum when it is added to hydatid fluid *in vitro*. The serums of patients with hydatid disease will fix complement in the presence of hydatid fluid, and a test has been devised analogous to the Wassermann reaction for syphilis. Other tests, based on the antitryptic content of the patient's serum and the rate of sedimentation of red blood corpuscles in blood freshly drawn and artificially prevented from clotting, are not specific. An intradermal test—local redness and swelling after intracutaneous injection of sterile hydatid fluid—is, however, of special value. Modern workers have differentiated two phases: there is an immediate reaction, such as occurs with the injection of any foreign protein, and a specific delayed reaction which is diagnostic of hydatid disease. Much light has been thrown on the latter phase of the reaction by the Fairleys, Dew and Kellaway (to whom the author makes due reference), working at the Hall Research Institute in Melbourne. Pinelli has carried out a series of observations on fifty-one cases of known hydatid disease, using the various methods mentioned. The intradermal reaction is far the most sensitive and practical, as it reacts positively in 86.2 per cent. of cases. Eosinophilia of over 6 per cent. was observed in one-third of the cases, a positive precipitin reaction in 23.3 per cent., and deviation of the complement in 31.3 per cent. These figures agree with and confirm those of recent workers.

[1] *La Diagnosi Biologica dell' Echinococcosi*. By Luigi Pinelli. With preface by Professor Giuseppe Sabatini. Sassari: G. Gallizzi. 1932. (Lire 45.)

HEALTH PROBLEMS IN AFRICA

The opening up of the African continent by new air routes is creating some new problems, which demand urgent solution. One of these is the danger of the spread of yellow fever to districts where it is at present unknown. Accordingly, at the request of the Government of the Union of South Africa, a conference of directors of public health services in certain African territories will meet in Capetown on November 15th, under the auspices of the League of Nations Health Organization, to study the practical application of the chapter in the new International Sanitary Convention on Air Navigation dealing with yellow fever. Other problems to be dealt with by the conference are the unification of measures for preventing the introduction of small-pox by vessels coming from British India, the problems raised by the endemic character of plague in certain districts of South Africa, and the organization of public health services for the benefit of rural areas. The director of the League's Eastern Bureau at Singapore will provide the technical secretariat for the conference, and the Health Committee will be represented by Sir George Buchanan. During their stay at the Cape the delegates will be the guests of the Government of the Union of South Africa.

The Bradshaw Lecture before the Royal College of Physicians of London will be given by Dr. Dugald Baird on "The upper urinary tract in pregnancy" on Tuesday, November 1st. Dr. James Collier will deliver the FitzPatrick Lecture on November 8th and 10th on "The development of neurology from the commencement of the nineteenth century to the present time." The Lloyd Roberts Lecture, on "The liberal education of the body," will be given by Professor L. P. Jacks on November 22nd. The lectures will be delivered at the College, Pall Mall East, S.W., at 5 p.m.

Cancer Research

Chemotherapy and Radium Therapy

The tenth Scientific Report of the Imperial Cancer Research Fund[1] was issued on October 14th, its immediate predecessor having appeared in January, 1931. In introducing the work of his colleagues—Drs. Cramer and Ludford and Messrs. Crabtree and Foulds—the director of the research work, Dr. J. A. Murray, F.R.S., states

"The report is an experiment in the presentation of pathological results devised to reduce the time and effort required of the reader, and I believe this is an endeavour wholly desirable, in view of the enormous increase in the volume of printed matter which is presented to the student of medical science."

We are in cordial agreement with Dr. Murray, and heartily congratulate him and his colleagues on the complete success of their experiment and in the production of a report which is clear, concise, interesting, and beautifully illustrated. All of the articles are of high scientific value, and many have a bearing upon cancer therapy which will at once be apparent to the medical reader. The papers in Dr. Murray's report deal with a variety of subjects. Perhaps those on the chemotherapy of tumours and on problems connected with radiation treatment will be of the most general interest, and will therefore be dealt with first.

Chemotherapy

The first paper, contributed by Dr. Ludford, is on the influence of vital dyestuffs and of inorganic colloids on resistance to transplantable new growths, and is based upon two short papers by the same author which appeared in the *British Journal of Experimental Pathology* (1931–2). The object of the investigation was to determine what influence injections of certain dyestuffs and inorganic colloids might have upon the growth of transplantable tumours of the mouse. The experiments fall into two categories. In the first, normal mice were injected with suspensions of a tumour which showed a natural tendency to regression. In the second, a partial immunity was established by first injecting suspensions of embryonic skin according to the method of Bashford, Murray, and Cramer (1907). Some animals in both series served as controls, the others were injected with the chemotherapeutic agents under investigation—namely, trypan-blue, vital-new-red (Grübler), and colloidal aluminium hydroxide and sulphur. Widely different in chemical composition as these bodies are, they yet possess one property in common, in that they are actively segregated by the macrophages which surround the tumour graft, and it is probably upon this property that the similar action of such dissimilar bodies depends. In all the experiments the resistance to tumour growth was found to be diminished and there was no evidence of any inhibitory action upon it, whether a tumour with a natural tendency to regression was used or whether the animal had been artificially immunized. The point is obviously of high practical importance, since various colloids and semi-colloids are from time to time being tried as therapeutic agents for malignant disease in the human subject, and it is possible that injudicious selection of the material or inaccuracy in dosage may lead, not to alleviation, but to aggravation of the malignant condition.

Trypan-blue and Reticulo-endothelial Cells

A paper on the effect of vital staining on the distribution of the Brown-Pearce rabbit tumour by Mr. Foulds deals with another aspect of the same subject—namely, the influence of a "vital" dye—trypan-blue. Here interest centres around the distribution and extent of metastases in control animals and in animals inoculated with trypan-blue. By injecting tumour emulsions into the ear-vein of rabbits metastatic deposits are produced which have a very characteristic distribution. They are frequent in the kidneys (90 per cent.), adrenals (70 per cent.), and the eye (31 per cent.); comparatively rare in the lungs (20 per cent.) and liver (18 per cent.); and entirely absent in the spleen. When rabbits so inoculated are also injected with trypan-blue a marked difference occurs. The spleen is no longer immune, but is the site of well-developed tumours (in seventeen out of thirty animals); the incidence of metastases in the liver rose to 82 per cent. and in the lungs to 76 per cent. Careful histological examination showed that absence or infrequency of metastases did not depend upon lack of access of the injected tumour cells to the organs in question. Neoplastic cells were clearly present, but they failed to develop. It is natural, therefore, to suppose that there is some agency at work which prevents their development in certain situations, and that injection with trypan-blue is able to counteract this protective action. The suggestion is made that the cells of the reticulo-endothelial system are responsible for the defensive mechanism, and that absorption of the dye by them acts in much the same way as described for the macrophages surrounding tumour implants. Further investigations are needed, but it is abundantly clear that here again is a warning against the indiscriminate use of colloid or semi-colloid therapeutic agents.

Radium Therapy

Dr. Cramer has two papers dealing with practical points in the therapeutic uses of radium in the treatment of malignant disease. In the first—on experimental observations on the effect of radium on a precancerous skin area—he deals with a set of experiments on 120 mice. These were painted with tar twice weekly, and the tar painting was stopped before any warts appeared. They were then divided into two batches, one of which was radiated over the painted area, while the other served as a control. Normally, mice so painted with a known carcinogenic specimen of tar, after a preliminary epilation develop warts upon the treated areas. These warts appear after varying periods (a few weeks to several months); at first they have the histological characters of benign papillomata, but subsequently they become malignant. With suitable samples of tar this sequence of events is very constant, so that the area thus treated may fairly be described as a precancerous area—that is, one in which there is a high degree of probability that malignant growths will develop. Irradiation was carried out by means of a square applicator containing 58 mg. of radium element, and screened with 0.18 mm. of silver. In some cases the areas (previously treated with tar, and therefore "precancerous") were irradiated for an hour, in others for thirty minutes. It was found that in the tarred areas the initial radium reaction was more intense than in areas not so treated. The development of papillomata and consequent malignancy was, however, delayed in the irradiated areas, and in some cases completely checked. The matter is of practical importance in the treatment of such conditions as mammary and rectal carcinoma. In the former case it has been shown by Cheatle that the foci of malignant disease are multiple, and in the latter, by Lockhart-Mummery and Dukes, that they arise from a relative extensive "precancerous" area, in which histological changes can be definitely recognized. For this reason the application of radiotherapy should extend over a much wider area than the macroscopically evident malignant growth and its immediate neighbourhood, so

[1] London: Taylor and Francis, Red Lion Court, Fleet Street. 1932. (30s.)

as to retard or prevent a subsequent development of malignancy in a potentially precancerous area.

In his second paper, on experimental observations on the therapeutic action of radium, Dr. Cramer discusses the questions of evidence for any general therapeutic effect resulting from radium therapy in malignant disease, and also the method of its unquestioned local effect. From time to time statements are made that local irradiation of a neoplasm has set up an extensive metastatic spread of the growth, and, conversely, that local radiation of a primary growth may be capable of producing an immunizing effect upon metastatic deposits already present. In a careful series of experiments with mice Dr. Cramer answers both these questions in the negative. The second problem which he discusses concerns the mode of action by which local regression follows irradiation of a new growth. Two views are held on this matter. According to one school of observers, tumour regression is due to a specific radiosensitivity of the neoplastic as contrasted with the normal cell elements of the irradiated area. According to such a view it is obviously necessary, in order that treatment should be successful, that all the cells in the tumour should receive a full lethal dose of radiation. According to the second view, while a damaging effect of radiation upon the malignant cells is fully admitted, the non-malignant elements (the "stroma"), the surrounding tissues, blood vessels, and wandering connective tissue cells are all regarded as participants in the process of regression. All recent experimental work seems to point to the latter being the true view of the case. Experience has shown what amount of radiation is necessary to ensure the regression of a particular strain of tumour under specific experimental conditions. If such tumours be exposed *in vivo* to a dose of radiation which is certain to cause regression, if they are then excised and fragments inoculated into other animals, growth will occur. In an isolated experiment various circumstances might be regarded as bringing about such a result—for instance, the exceptional resistance of certain odd cells which upon transplantation again commence to grow and form a tumour. But when the same phenomenon is observed repeatedly, consistently, and with different tumour strains, it seems, on the face of it, extremely probable that some other agency is at work than a merely specific lethal effect upon malignant cells. There is no doubt whatever that radiation can kill malignant cells, but the dosage required to effect this is very considerable; the *in vitro* experiments of Laser and Halberstädter, and of Santesson, indicate that the dose necessary to produce an effect on tumour cells is about the same as that required for normal fibroblasts.

An irradiated tumour is seen to be surrounded by macrophages and by young fibroblasts, these cells growing in among the tumour tissue and breaking up the more or less homogeneous mass of neoplastic cells. The surrounding and invasion of the irradiated neoplasm by these types of cell suggests that irradiation has produced cell changes which have set up a positive chemotaxis. The alterations of blood vessels, the engorgement, dilatation, and diapedesis following radiation, have been familiar from the earliest days of animal experiments upon the action of radium and *x* rays. The blood vessels in and surrounding a neoplastic area are no exception to this rule. The initial engorgement and diapedesis give rise to the local accumulation of connective tissue cells, while the subsequent thrombosis and obliteration of the vessels serves to cut off the blood supply to the tumour. That vascular changes have a potent effect in the causation of tumour regression receives strong confirmation from the experiments of Strangeways and Fell (1927). These workers, in observing the effects of radiation upon embryonic tissues (chick embryos), noticed that radiation administered to very early embryos (20 to 25 hours old) had a very much less marked deleterious effect on subsequent development than when older embryos (6 to 17 days) were subjected to the same dose. In the early embryos the vascular system and circulation were undeveloped, whereas in the older embryos both were well established, and of course damaged when exposed to radiation. That an altered vascular system was, at any rate, largely responsible for the apparently greater radiosensitivity of the older embryos was shown by making explants from irradiated specimens of both early and later embryos. In both cases cells removed and cultivated *in vitro* developed upon the same lines, thus indicating that the differences observed when development was allowed to proceed *in ovo* arose, not from a difference in sensitivity of the two groups of embryonic cells, but from changes resulting from the action of the radiations upon the circulatory system. Dr. Cramer quotes the work of Maximow (1923) as bearing on the subject of tumour regression consequent upon radiation. In this case aseptic inflammatory changes were produced by the introduction of sterile celloidin into the subcutaneous tissue of rabbits, but when the inflamed areas were treated with *x* rays a marked repression of the usual reaction on the part of the fibroblasts was observed.

The conclusions drawn by Dr. Cramer from his work are: first, that the action of radiation in producing neoplastic regression is a complex one, depending upon action on non-malignant as well as on malignant tissues and cells; and, secondly, that radiation should be applied so as to produce uniform action upon the tumour as a whole, and also that the dosage should not be so excessive as to throw out of action the non-malignant cell elements, which are of fundamental importance in the production of regression and of subsequent repair.

Metabolic Changes Produced by Radiation

Mr. H. G. Crabtree writes on changes in carbohydrate metabolism induced by radium irradiation of tissues. The paper is one of great technical interest and importance, and contains full experimental details of the methods employed. Studies were made of the effects of radiations ($\beta + \gamma$ and γ only) on different animal tissues both *in vivo* and *in vitro*. Those selected were the testes and spleen of the rat and Jensen rat sarcoma. This selection was made as it was found that they offered the best chances of survival for experimental purposes when removed from the body. The respiratory processes were always found to be affected by radiation: *in vitro*, tissues under constant irradiation gradually lose their power of using oxygen after an initial period of some hours. Control specimens respire freely, though ultimately suffering the same fate. Radium radiation therefore accelerates a normal degenerative process and does not initiate it *de novo*. Glycolytic processes are much more resistant to the radiations, as during the period of progressive decay of the respiratory power to a negligible value glycolysis remains unchanged. No essential difference was found in the behaviour of normal and of tumour tissues under the influence of the radiations. A point of very great practical importance from the experimental point of view is the extraordinary care which is necessary in the preparation of the medium (a Ringer solution) in which the irradiation is allowed to take place. Details of the methods cannot be given in a short abstract like the present one, but the environment of tissues during radiation is a matter of paramount importance, not only if their metabolism is under investigation, but if they are to be used for subsequent inoculation experiments. Stress is laid upon this by Dr. Cramer in his paper on the therapeutic action of radium in the present volume. It is only comparatively recently that the response of a cell to its chemical environment has received anything like

adequate consideration. This is especially the case with hydrogen-ion concentration, alterations in which may completely mask or even destroy other processes which may be the subject of investigation.

A second paper by Mr. Crabtree—on the effects of radium irradiation on the succinoxidase extracted from muscle—again deals with the subject of oxidation, but here the investigation is not directed to intact tissue elements or cells, but to the solution of an oxidizing enzyme which can be extracted from the muscle of the ox. Broadly speaking, the effect of radiation is an irreversible inactivation of the enzyme. This is found to be true with $\beta + \gamma$ ray and with γ ray irradiation alone. Recent experimental work all seems to point to the fact that interference with the oxygen metabolism of the cell must play an important part in the action of radiations on living tissues. It is generally admitted that mitochondria are concerned with the oxidative processes in cells, and well known that they are amongst the first cell structures to show changes under radiation, being even more sensitive than the cell nucleus. Quite recently Colwell (1932) has shown that β radiations have a well-marked reducing effect upon various simple chemical substances, and a similar though very much smaller result was obtained with γ radiation alone. The same effect was noted by Waterman for x rays.

Cytological Changes After Radiation

Dr. Ludford publishes the results of a complete series of cytological observations upon irradiated tumours. Hitherto attention has been—in the case of tumour cells—mainly confined to the nuclear changes which follow radiation. Details of the various cytological changes produced in different tumour strains are very fully given in the paper. Briefly summarized, they are, for one tumour strain, as follows. An immediate effect is produced on the mitochondria, which become vesicular in forty minutes ; there is an inhibition of mitosis followed by increased mitotic activity. An increase in the size of individual cells is accompanied by an increase in the number of mitochrondria and enlargement of the Golgi apparatus. Irradiated cells, both normal and malignant, show increased staining by the "vital" dye trypan-blue. The primary effects of radiation upon cell colloids is probably much the same in all cells, as well as the concomitant inhibition of mitosis Capacity for recovery, as well as subsequent changes, differ very markedly in different types of cell.

Dr. Ludford's second paper is devoted to the differential reaction to trypan-blue of normal and malignant cells *in vitro*. Various types of mouse tumours were explanted, and when growing *in vitro* they did not segregate trypan-blue in the same way as their non-malignant prototypes.

The final paper in the volume, contributed by Mr. Foulds, is on the vital staining of fowl tumours. Both *in vivo* and *in vitro* the parenchyma cells of fowl tumours differ from non-malignant cells in that they do not segregate trypan-blue. In this respect the behaviour of avian and of mammalian neoplasms is therefore identical.

NATIONAL RADIUM

THE COMMISSION'S ANNUAL REPORT

The third annual reports of the National Radium Trust and of the Radium Commission are published together this week by H.M. Stationery Office. The former is mainly concerned with purchases and deliveries of radium and with the financial position of the Trust at the end of the last financial year. The report of the Radium Commission covers the period from September 1st, 1931, to August 31st, 1932.

National and Regional Centres

The year's work was concentrated largely on the development of the national radium centres and the regional radium centres. In addition, clinical statistics on the standard forms relating to patients treated with national radium in 1930 have been received from those centres which were then in full working order, and these are being collated for the five-year statistical analysis, which is one of the main goals of the Commission's policy. The eight English national centres, the four Scottish national centres, and the Welsh national centre at Cardiff have been supplemented by the setting up of five regional radium centres, situated respectively at Norwich, Nottingham, Plymouth, Southampton, and Stoke-on-Trent. These regional centres are not associated, like the national centres, with recognized medical schools, but they have given the Commission satisfactory assurances that they can carry out the national radium policy at the same level of efficiency and in the same spirit of co-operation. Though all the centres are established in voluntary hospitals the intention is that treatment with national radium should be available to all patients for whom it is required ; thus treatment is not withheld from those able to meet the full charges at the hospitals to which they are admitted, but the restriction is imposed that such patients may not occupy more than 20 per cent. of the whole number of beds allocated to radium treatment.

In order to promote fuller use of national radium steps were taken during the year to bring to the notice of all concerned the additional facilities for radium treatment available at the centres now established. There has been a ready acceptance by nearly all the centres of the three outstanding principles laid down by the Commission—namely, the appointment of a specially trained radium officer ; the proper co-ordination of ancillary services ; and the admission of patients for radium treatment from other hospitals in the area, whether voluntary or rate-aided.

Distribution Policy

The total amount of national radium now on loan, to national and regional centres, to the Medical Research Council, and to the National Physical Laboratory is 16.609 grams ; further allocations amount to 2.482 grams. Special attention is drawn in the report to one aspect of the distribution problem. The Commission's policy of concentration in connexion with national radium has been undeviatingly pursued, in accordance with the principle laid down in its first report—that

> "considerations, both of efficiency and economy, require that patients should in most cases be brought for treatment to the centres which possess fully equipped clinics and specialist staffs, rather than that the radium should be taken to them."

This policy has been scrupulously adhered to by the centres as a whole, but in one or two instances a tendency has developed to interpret the principle of concentration as applying to *national* radium only, and as permitting and indeed facilitating the release and distribution for use, outside the centres, of radium which may be the private property of the hospitals concerned. This development, which no doubt had been conceived in good faith, is incompatible with the fundamental object of the Commission's policy.

Under the agreement entered into with the Commission, the Mount Vernon Hospital and the London Radium Institute have continued to constitute a post-graduate centre of radiotherapy. The annual reports from both of these institutions go to show that in spite of many difficulties, economic and otherwise, the demands of medical men requiring instruction, whether clinical or experimental, in the subject of radiotherapy, are being met. Acknowledgement is made of the friendly and mutually helpful relations that subsist between the Commission and other bodies immediately concerned in the treatment of malignant disease.

Radium "Bomb" Therapy

Reference was made in the two previous reports of the Commission[1] to the experimental work carried out at the Westminster Hospital with the four-gram bomb, which was loaned in the first place by the Commission and later by the King's Fund.

As a result of a confidential report furnished by the hospital, the Commission recommended to the King's Fund (the then owners of the bomb) that work should not be continued with it in its present form, and that it should be split up into separate one-gram units for the development of surface radium therapy. This recommendation of the Commission was accepted by the King's Fund, and was also approved by the "Conference on Radium," called by the Presidents of the Royal Colleges of Physicians and Surgeons, which published its report on May 20th, 1932.[2] The four-gram bomb has now been split into one-gram units, which have been allocated to the Cancer Hospital, the Middlesex Hospital, and University College Hospital respectively, the remaining gram being left by the King's Fund at the disposal of the Westminster Hospital. The three former hospitals were simultaneously invited by the Commission to form a Standing Clinical Committee, which would act as a general controlling body for the development of work with these units. This committee, which includes representatives from all three hospitals, has held a number of meetings, and seems likely to be of the greatest service in ensuring the proper co-ordination of the investigation and in obviating any overlapping of individual efforts. There has been complete unanimity between the three hospitals as to the type of apparatus, which has been specially designed, and as to the limitations of the actual beam of radiation which will be used in the joint scheme of therapy. By this means a most valuable elimination of variables has been effected. On the other hand, each of the hospitals has been given a perfectly free hand to make use of its unit in treating whatever forms of malignant disease it may select. The methods employed are then communicated to the other participating hospitals, and, working as they are in the closest sympathy and co-operation, the Commission is confident that within a few years the value of these one-gram units will be definitely ascertained, whilst the experience gained from them may justify the use of progressively larger units, if that course should seem desirable.

General Conclusions

The report includes some plain words on the need for care in the custody of radium, and ends with the following general conclusions:

During the year under review the Commission has been subjected to the usual amount of criticism and advice with regard to the discharge of its responsibilities, and whilst it has at all times endeavoured to keep an open mind and a receptive ear it has conceived its duty to be to steer a prudent and middle course between the warnings of those who deprecate too venturesome a progress and the urgings of enthusiasts who are impatient at the suggestion that one should learn to walk before attempting to run.

Progress has undoubtedly been made, and not least in the direction of a wider realization of the perils attendant upon an unrestricted distribution of perhaps the most potent (and incidentally the most costly) substance known to man, or upon its use by other than highly qualified and specially trained persons. Whatever may be the ultimate place that radium will gain and hold in the armoury of the surgeon and radiologist there is no doubt in the mind of the Commission that its policy of caution and concentration, at the present stage of world knowledge, is essential, and must be inflexibly pursued.

[1] *British Medical Journal*, 1930, ii, 656; 1931, ii, 715.
[2] Ibid., 1932, i, 952.

MOTOR CARS FOR 1933

THE OLYMPIA SHOW *

[From our Motoring Correspondent]

One of the outstanding features of show week has been the great interest shown in the cars fitted with the self-changing gear-box, controlled by a small pre-selective lever on the steering column. Although one would not yet prophesy the entire disappearance of the older form of gear-box control, the trend is certainly in that direction, for it was noticeable during the week that several additional car manufacturers issued announcements to the effect that, where desired, they were now prepared to provide vehicles with the new form of change-speed control at an extra cost.

Some Coventry-built Cars

Three popular Coventry-built cars are the Standard, Singer, and Rover. While the Standard Company is continuing to produce the well-known "Little" and "Big Nine" four-cylinder cars, the chief feature of the 1933 models is the addition of two six-cylinder vehicles known as the "Little Twelve" and "Big Twelve," the prices of the saloons of which are £189 and £215 respectively. The Singer Company's programme has been considerably modified since last year. Thus the "Junior" has been replaced by a 9 horse-power four-cylinder model having a longer wheel base and wider track, which allows of more roomy bodywork. Like the larger Singers, the "Nine" is provided with a four-speed gear-box of the silent-running type, and in the de luxe saloon form is listed at £174. The next larger chassis, which has a wheel base of 9 ft. 0½ in., is available either with a 12 horse-power four-cylinder or 14 horse-power six-cylinder engine, the prices for the first being either £199 or £221, and £235 for the bigger one. Many new features are embodied in the 1933 series of Rover cars, which include a 10/25 horse-power "Family Ten," with either a three- or four-speed gear-box, at £195 and £200, a 10/25 horse-power "Special Ten" saloon at £228, and the 14 horse-power six-cylinder "Pilot." Among the new details of Rover cars are an "easy free" gear-box, a free-wheeling device, and the "Startix" instrument for automatically restarting the engine should it be accidentally stopped when driving in traffic.

Riley (Coventry) Ltd., whose cars mainly appeal to sporting motorists, though they are now being favoured by many of the younger members of the medical profession, in addition to continuing the four-cylinder "Nine" and the 14 horse-power six-cylinder cars, have introduced a new "Twelve-Six," which, like the others, is built lower than formerly, without, however, reducing the head room. It was announced during the past week that arrangements have now been made to fit the Riley cars, at an extra cost, with the Salerni fluid flywheel and pre-selective change-speed gear.

More British Cars

Originally a 9 horse-power, the A.J.S. four-cylinder car built by Willys Overland Crossley, Ltd., has, in its 1933 form, become a 12 horse-power, with "synchro-silent" four-speed gear-box, free-wheeling device, and "one-shot" chassis lubrication. An entirely new four-cylinder "Ten" at £198 forms the principal innovation in the Citroën Company's range of productions, prominent features of which are the rubber mounting of the power unit, the low-pressure tyres, and the one-piece body construction. Other Citroën models include a four-cylinder "Big Twelve" at £230, and a six-cylinder "Twenty" at £295. While continuing the 15.7 horse-power and the 20.9 horse-power six-cylinder cars, Crossley Motors, Ltd., are devoting increasing attention to the 10 horse-power chassis introduced a year ago, which has now been improved in detail, and provided with an additional type of body—the Buxton saloon, priced at £298. As an extra, the Crossley cars can now be provided with self-changing gear-boxes. The 7 horse-power Jowett continues as the only car fitted with a two-cylinder engine. Various detail improvements have been effected in the chassis, and a new "Kestrel" saloon at £175 added to the range of bodywork. The 10 horse-power Trojan is also again the only car fitted with a two-stroke engine; the vehicle remains practically unchanged, only detail modifications having been made. Other British cars at Olympia to which attention may be briefly drawn are the "Super Eight," "Super Nine," and the "Twelve-Six" of the Triumph Company; the 17 horse-power six-cylinder "Cadet," which is the only model now

* Concluded from page 727.

being manufactured by the Vauxhall Motor Company, Ltd., and which has been improved in many details ; and the six-cylinder cars of the Wolseley Company—12, 16, and 21/60 horse-power—the two larger models of which now include a free-wheeling device.

The Latest Ford

Now that the extensive new works at Dagenham, Essex, are practically completed, the Ford Motor Company, Ltd., is again becoming an important factor in the motor industry of this country. During the past week this concern has been holding a special exhibition of its own at the White City, where the new 8 horse-power four-cylinder Ford, now in production, has attracted considerable attention, as much for its low price—£120—as for its interesting details, which include rubber mounting of the engine and an easy-change gear-box, features which are also found in the 14.9 and 24 horse-power four-cylinder cars. A good deal of interest is also being shown in the new Ford 30 horse-power eight-cylinder model, the heavy annual tax on which, however, will, it is imagined, place it outside the purview of the majority of medical men.

Special Motor Bodywork

Notwithstanding the excellent finish, both external and internal, of the modern mass-produced bodywork of cars, there is still a section of the motoring public which prefers to have chassis fitted with bodies more in accord with individual preferences. Thus, the carriage-building section of the show has a great attraction for many visitors. Among the firms in this section which have for some years specialized on motor bodywork for doctors' cars is Mann Egerton and Co., Ltd. Their smallest exhibit is a single drophead coupé on a 20 horse-power Sunbeam chassis. Incidentally, it may be mentioned that this firm has issued a handy little *Buyer's Guide*, giving particulars and prices of all the leading cars on the market. Among other noteworthy vehicles in the carriage-building section are a Romney folding-head coupé built by Martin Walter, Ltd., on a Vauxhall " Cadet " chassis, and a Tickford foursome coupé on a Hillman " Minx " chassis by Salmon and Sons, the feature of the Tickford being that, instead of having only a partially opening roof, the vehicle can be converted by a handle arrangement in a few seconds from an entirely open to a closed car, and vice versa, according to the weather.

Prices

In its last issue the *Autocar* published a useful list of car prices, dividing the various vehicles into a number of categories ranging, for covered cars, from £115 up to no less than £2,650. Taking, however, as last year, £350 as being the outside limit of what the average medical man is likely to desire to pay in these times of reduced incomes and heavy taxation, and, beginning at the lower end of the scale, there is a choice of five makes the cost of any one of which does not exceed £145. In the £151 to £200 division there is a selection of no fewer than twenty-one different models, including such well-known productions as the Morris Cowley and the Morris " Major," the 8, 9, and 12 horse-power Triumphs, the 9 and 12 horse-power Singers, the Hillman " Minx," the " Little Nine " and " Little Twelve " Standards, the 14.9 horse-power Ford, the Rover " Ten," the Citroën " Ten," the 12 horse-power Wolseley " Hornet," and the 10, 12, and 14 horse-power Austins, the last-mentioned having a six-cylinder engine. Between £201 and £250 there is again a choice between a dozen cars, prominent among them being the 14 horse-power Singer and the 16 horse-power Standard. Six-cylinder cars predominate in the £251 to £300 group, which includes the 12 horse-power Armstrong-Siddeley, the Morris Oxford, the 14 horse-power Rover, the 10 horse-power Crossley, the new 12 horse-power Humber, the 16 and 21 horse-power Hillman, " Wizards," the Citroën " Twenty," the Riley " Nine," and the 17 horse-power Vauxhall " Cadet." Finally, in the £301 to £350 category there is a selection between sixteen makes of cars, all, with three exceptions, having six-cylinder engines. They include the 10 horse-power Lanchester, the Austin " Sixteen," and the Morris " Isis." While the prices mentioned above relate to the standard saloons, several makers are producing de luxe models at an additional cost of from £20 to £30, which place them in a higher category, while most manufacturers nowadays include in their range a car with a coupé body with dickey seat, the prices being generally slightly higher than for the usual saloons.

Accessories

Among the novelties in the accessory section is a rubber truncheon which has been introduced by David Moseley and Sons, Ltd., as the result of the bandit scare. At the Gamage stand are to be seen, among a range of useful fittings, a combined fog and inspection lamp adapted to be mounted in a low position on the near side of the car to facilitate driving in foggy weather. Those medical motorists who, like the writer, prefer the older form of ignition to the modern one, which relies on the lighting and starting battery for its source of current, will be interested in the new type of magneto introduced by Scintilla, Ltd. ; the new instrument, known as the " Vertex," is a vertically driven instrument designed in such a way that it can readily be mounted on the engine in place of the existing coil ignition set. Finally, in connexion with last week's remarks on the need to use some form of anti-freezing mixture in the radiator during the winter months, attention may be drawn to the zero glycerin which Price's Patent Candle Company, Ltd., is supplying in convenient-sized tins.

C. J. W.

England and Wales

LEEDS AS IT USED TO BE

The capital of the West Riding, with a population now of about half a million, a municipal area of nearly sixty square miles, well ordered and governed, well watered and sewered, and progressively minded in health matters, would hardly recognize itself in a statistical report issued by its Corporation in 1839, and now reprinted with a foreword by Dr. Arthur Hawkyard, chairman of its Mental Health Services Committee, and now Lord Mayor. The condition of Leeds at the beginning of the Victorian era, as disclosed by this survey, was appalling. No wonder cholera had lately visited it, and was to visit it again.

The first comment made by the Statistical Committee of the Corporation in 1839 concerns the filthy and offensive streets. In the north ward all the streets were more or less deficient in sewerage, unpaved, ill lighted or without lamps, and with cellars sometimes dangerously exposed, while offensive refuse of every kind was piled against the walls. In the north-east ward there were several horrible places, utterly impassable for filth, and in the east ward many Irish families kept pigs in the cellars in which they themselves lived. Out of the total of 586 streets in Leeds, 244 were described as " good," but the word had only a relative significance ; the number of streets which belonged to the town was 70, and these, being cleaned by scavengers, were the only ones entitled to the adjective in the absolute sense. Comment is made on the astounding want of out-offices. Three streets in the Bank containing 100 dwellings, with a population of 452 persons, had only two sanitary offices, neither of which was fit for use ; the consequence was that the streets became the receptacle for ashes, filth, and refuse of every description. Another nuisance noted was the intersection of streets with clothes lines. It is even stated that nearly half the streets of Leeds were so full of lines and linen as to be impassable for horses and carriages, and almost so for foot passengers. The dreadful description of the regurgitating sewers makes one wonder why Leeds was not depopulated. In the north-east and north-west wards sump holes, stagnant water, and inundated or damp cellars abounded. Housing seems to have been bad almost beyond imagination. In some parts of the town there were five or six persons to a bed, and generally two or three, frequently

without separation of sexes or consideration of age. In one alley, known as Boot and Shoe Yard, with 340 inhabitants, there was an average of six persons to each room. In three houses in what were known as Dixon's Buildings there were three sleeping rooms with four beds, which had to accommodate nineteen persons.

The report appears to find a connexion between morality and occupation. It states that the most prominent violators of the law at that time were butchers, blacksmiths, bricklayers, clothiers, woolcombers, dyers, joiners, masons, machine makers, shoemakers, tailors, watermen, and weavers. People following these occupations seemed to be more addicted to intemperance and dissipation than others, and the children in the wards where these persons resided were characterized by "a degree of brutality" which did not exist elsewhere. The number of houses of ill fame (51 public and 47 private) was comparatively small, and it is marked that prostitution seemed to be not so extensive as in other places, though a deplorable laxity of moral discipline was noted. Leeds at this time had a population of 82,000, and the death rate per 1,000 was 35 as compared with 28 for the kingdom as a whole; the Leeds death rate now is 16.5. In the aggregate of adult deaths consumption appeared to be the prevailing cause. The trades of the shoemaker and the tailor seemed exceedingly prejudicial to longevity, "either by the vicious habits which seemed to attach to the persons following them, or by the operation of the trades themselves." Out of 58 deaths of shoemakers during the year under review, 28 were attributed to consumption, and out of 65 deaths of tailors, 35 were set down to the same cause. The birth rate in Leeds, now 15.5 per 1,000, was then 39, and what one fancied to be a modern problem, the comparatively high fecundity of the lowest classes, exercised the minds of the Leeds Corporation almost a hundred years ago. Among 1,936 married flax dressers, hand loom weavers, dyers, and cloth drawers, the number of children to the family was 2.53, while among 1,945 married persons of the independent and professional classes the number of children to the family was 1.92.

It is a depressing cross-section of industrial England in the second quarter of the nineteenth century which is revealed by this survey, but it shows at least that there were men of public spirit among the Leeds councillors at that time ready to adopt a bold policy, though Dr. Hawkyard tells us that it was not until 1866, when the council appointed a medical officer of health, that any radical improvement took place. Since then rapid progress has been made, and to-day thousands of men and women are employed in health and ancillary services, and last year £1,200,000 was spent in Leeds on health, maternity and child welfare, infectious diseases hospitals, tuberculosis, sewerage, street cleansing and highways, the collection and disposal of house refuse, and mental health services.

Harrogate Provident Association

A public meeting in support of the Harrogate Provident Association was held at Harrogate on October 3rd under the presidency of the mayor. The chairman said that similar schemes had been tried elsewhere with great success, and though Harrogate was not an industrial town there was no reason why such a scheme should not prosper there and be a benefit to the whole of the community. The Rev. J. M. Cunningham, the chairman of the association, said that for the well-to-do there were nursing homes and for the working classes hospitals were available, but for the middle class there was great need of such an association in time of sickness. Its object is to provide, at a moderate rate of subscription, a fund for the payment of fees for specialists' consultations, surgical operations, and nursing home treatment. There is no limit as to age or income, and a member becomes eligible for benefit after three months' membership. The members make their own arrangements for professional services and the association provides financial assistance. The association is managed by a council of twelve, of whom eight are representatives of the members and four are nominated by the Harrogate Medical Society. The benefits payable include a contribution not exceeding £5 per week for a period of five weeks towards the cost of maintenance in a nursing home or a private paying bed of a hospital. A sum of £2 2s. is provided for a consultation with a specialist at the consultant's house, or £3 3s. if the consultation takes place within four miles of his residence, with an additional 10s. 6d. in respect of each further mile, subject to a maximum contribution of £12 12s. A contribution not exceeding £35 is payable in any one year towards the cost of a surgeon's fee for operation. Fees are also payable for *x*-ray and pathological examinations, anaesthetics, and for treatment by massage and electricity.

Instrument Makers' Annual Dinner

The annual dinner of the Surgical Instrument Manufacturers' Association took place at the Holborn Restaurant on October 14th, under the chairmanship of Mr. Patrick C. Maw (S. Maw, Son and Sons, Ltd.). The principal guests were Mr. Duncan Fitzwilliams, F.R.C.S., Sir Charles Hipwood, director of the National Union of Manufacturers, with which the association is affiliated, and Mr. F. Gladstone Hines, president of the Pharmaceutical Society. In proposing the toast of "The Association," Mr. Fitzwilliams announced himself a wholehearted protectionist, and expressed a strong preference for British-made surgical goods. Some time ago he had himself addressed a letter to the medical and nursing journals pointing out that foreign-made goods, sold at a price below the cost of production in this country, were being widely bought by British hospitals. At that time American catgut and gloves and French genito-urinary and other instruments were being widely purchased in this country. He was glad to say that since then all the hospitals with which he himself was connected had decided to "buy British." Mr. Patrick Maw, in responding to the toast, said that it was not only hospitals which bought foreign-made goods, but public bodies to a large extent. Not long ago an important county council specified on its tender forms a foreign brand of enamel ware, when quite as good, if not better, ware was made in this country. The association had a tariff subcommittee, which had been spending some weeks in getting up the British surgical manufacturers' case; this had now been completed and presented for what it was believed would be favourable consideration. Turning to domestic matters, Mr. Maw said that it was remarkable how the craft of surgical instrument making appeared to descend from father to son. His own great-great-grandfather had started the business of which he was now the head, and he believed it was his grandfather who gave to the first chairman of the association, Mr. A. W. Down (1917–22), his training in the business. His grandfather had also trained Mr. H. C. F. Baxter (John Weiss and Son, Ltd.), who had just completed the remarkable record of fifty-seven years in the trade. Mr. Ernest W. Mayer (Mayer and Phelps), in proposing the health of the guests, said that the trade, like other trades, was passing through very difficult times, and a point of grave importance was that if no work could be found now for its men, in a few years' time there would be no men for its work, because it took six or seven years to train a skilled instrument maker, and at present practically no fresh apprentices were being taken on. Sir Charles Hipwood, in responding to the toast, addressed his remarks to the results of Ottawa. British traders had not, he said, got

all they wanted from Ottawa, but it must be remembered that the Dominions had started on protection a long time before the Home Country, whose hands for eighty years had been tied behind its back in respect of freedom of bargaining. The first bargain now made was with the British family of nations ; it was only a beginning, but if it were regarded broadly, he thought it was not a bad beginning. The Dominions had agreed to make quite considerable reductions in a wide range of commodities, and the bargain held for five years, so that for that time at least the British manufacturer knew exactly where he stood. Perhaps in a time not very remote the Empire as a whole might be in a position to make a bargain with the rest of the world.

Leicestershire County Sanatorium

Sir George Newman opened, in September, the new Leicestershire Sanatorium and Isolation Hospital at Markfield. The total number of beds provided is 180, of which 126 are reserved for tuberculosis and 54 for other infectious diseases. Provision has been made in the infectious diseases enclosure for duplicating the present accommodation, and there is ample scope for additional blocks for tuberculosis cases, should enlargement of the institution become necessary. The blocks for these cases have verandas on their south sides, and permit the placing of beds on them when the weather conditions are suitable. The wards in the tuberculosis blocks accommodate from one to four patients each ; covered ways run from them to the common dining room and pathological block. A school room has been provided for children. The necessary enclosure of the blocks for infectious diseases has been secured by erecting an embankment covered by shrubs. The observation block comprises twelve single-bedded wards, with a duty room and sanitary annexes ; at its end is a small operating room. The grounds have been laid out with belts of trees on the north and east sides of the site, to afford protection from the wind.

Scotland

Royal Medical Society of Edinburgh

The opening meeting of the 196th annual session of the Royal Medical Society of Edinburgh took place on October 14th, with Dr. W. M. Arnott, senior president of the society, presiding. Lord Moynihan delivered the inaugural address, and took as his subject "Ancient medicine and surgery." With the help of a series of lantern slides, including photographs of Egyptian mummies, bones, statuary, and paintings, he demonstrated the diseases that had afflicted man in ancient times. He showed that osteoarthritis had been common among the ancient Egyptians, and that the Neanderthal man had suffered from tuberculous disease of the spine. Actinomycosis had been demonstrated in Indian and Egyptian mummies of 1500 and 3000 B.C., and a skull 6,000 years old had showed evidence that its owner had suffered from mastoid disease. The Pharaoh of the Oppression, Lord Moynihan stated, had died from appendicitis, and there had also been evidence from the condition of his heart and aorta that the hardening of the heart mentioned in the Book of Exodus was an actual physical fact. Speaking of the operation of trephining shown by many ancient skulls, he concluded that the object of this had been to enable an evil spirit to escape. Since a severe operation was known to cause the symptoms of epilepsy to disappear for a year or two, this might explain the existence of five holes in one skull which he showed, the suggestion being that an evil spirit had been exorcised by operation, and, the symptoms returning, the operation had been successfully performed again and again. A vote of thanks to Lord Moynihan was proposed by Professor D. P. D. Wilkie.

Glasgow Post-Graduate Courses

The winter session of the Glasgow Post-Graduate Medical Association opens next month. Special lectures will be given at the Royal Faculty of Physicians and Surgeons' Hall dealing with some of the practical problems of medicine in the light of recent observations and research. The series of lectures starts on November 15th, when Professor Andrew Hunter will discuss hormones. They will be open free to all medical practitioners. A series of weekly demonstrations for practitioners on Wednesday afternoons will commence at the Royal Hospital for Sick Children on November 2nd, when Professor G. B. Fleming will deal with pneumonia in infancy and childhood. The demonstrations, which will cover a wide range of subjects, have been arranged on similar lines to those of previous years. Such a series of demonstrations should prove of value to practitioners who wish to keep in touch with recent advances in a general way and to compare the methods of diagnosis and treatment employed in different institutions. The fee for the course is three guineas. Special courses have been arranged at the Glasgow Eye Infirmary for those interested in ophthalmology, and facilities for the study of clinical obstetrics and ante-natal work are offered by the Royal Maternity and Women's Hospital. The staff of the Ear, Nose, and Throat Hospital has arranged demonstrations on ear, nose, and throat affections, and a course in radium therapy is offered at the Glasgow and West of Scotland Radium Institute and in the Glasgow Royal Cancer Hospital. Full particulars can be obtained on application to the secretary, Post-Graduate Medical Association, the University, Glasgow.

Child Life and Health

In his address to the Edinburgh Women Citizens' Association on October 12th Dr. Charles M'Neil, professor of child life and health in Edinburgh University, said that the education of the nurse of the healthy child was of great importance, and it was desirable to bring the training of such nurses up to the same level as that of nurses for sickness. Much had been done by schools for mothercraft, for Norland nurses, and for child welfare nurses, but the training was still far behind that provided for the sick-nurse. Training should cover the diet of babies and small children, and the standards of health up to the age of 5 years, so that the children's nurse could recognize slight deviations from these standards. This was ideal work for women, and there were only two places where such training could be given—maternity hospitals and child welfare centres. Child welfare nurses had already greatly improved the homes of the poor, and he hoped that the number of such nurses would be increased tenfold, and that they would be given far more responsible work than at present.

Tribute to Ronald Ross

Professor James Ritchie, in his introductory lecture in the chair of biology at the University of Aberdeen on October 11th, spoke of the work of Sir Ronald Ross, and described him as one of the greatest benefactors of humanity, whose knowledge of biology, genius for research, and perseverance had been mainly instrumental in making malarial areas of the Tropics safe for Europeans to live in. The discoveries of Ross would, he believed, save more lives than war had lost. The problem of malaria had faced mankind from the days of the ancient world, when its general association with swamps had led to the belief that it was due to the "marsh

miasma " of evening mists. Its mode of spread, however, and any satisfactory method of control had remained quite unknown except for the cure by means of cinchona bark discovered by South American Indians several centuries ago. In Scotland the disease had been prevalent and persistent, and, known as the " ague," it had, every spring, laid aside so many field workers that agriculture had sometimes to be suspended. Abroad it used to be reckoned that of every five Europeans who worked in the Tropics two succumbed to malaria, and the annual death rate in India from this cause was said to have been formerly over one million. Ross's great discovery had been that the disease passed from a fevered patient to a healthy person through the agency of blood-sucking mosquitos. Measures founded upon this new knowledge had banished malaria from many hitherto unsafe places, and the efficiency of modern methods of control would ensure still greater success in the future.

Ireland

Royal Academy of Medicine

At the annual general meeting of the Royal Academy of Medicine in Ireland, held in Dublin at the Royal College of Physicians on October 3rd, officers and council were appointed for the ensuing session. Professor T. Gillman Moorhead was re-elected president, Dr. T. P. C. Kirkpatrick general secretary, and Mr. William Doolin secretary for foreign correspondence. The following were elected presidents of Sections: Medicine, Dr. W. G. Harvey; Pathology, Dr. J. McGrath; Surgery, Mr. Henry Stokes; Anatomy and Physiology, Dr. W. J. E. Jessop; Obstetrics, Dr. G. Tierney; State Medicine, Dr. J. P. Shanley; Laryngology and Otology, Mr. Patrick Dempsey.

National Maternity Hospital, Dublin

Dr. J. F. Cunningham, Master of the National Maternity Hospital, Dublin, states in his annual report that 15,000 patients were admitted to the hospital during the year, while the number of applications for treatment in the out-patient department was 7,766. Forty-eight students and fifty nurses were admitted to the hospital during the year to undergo periods of training. The report also states that 400 operations were performed in the gynaecological department. The Governors' report refers to the work of Dr. P. T. McArdle, who retired from the mastership in September, 1931, and who has since been elected to the Board of Governors. During the year a contract was signed for the building of the central block and the first wing of the new hospital, the cost of which will be about £80,000. It is hoped that the reconstruction of Antrim House will be completed at the same time as the new buildings—namely, the spring of next year; further building operations will depend on the amount received from sweepstakes. In the year 1931–2 the Governors received the sum of £88,398 19s. from the Hospital Sweepstakes Committee; they deplore, however, the falling off in subscriptions and donations, which, they state, are essential to the work among the destitute poor.

National Health Insurance in the Free State

It is stated that the Irish Free State Government has decided on a radical reorganization of the National Health Insurance Commission. The administration of the Insurance Acts is to come under the direct control of the Department of Local Government, with a principal officer or controller in charge, who will be directly responsible to the Minister and Secretary of the Department. The three commissioners, Sir Joseph Glynn, Dr. W. J. Maguire, and Mrs. M. L. Dickie, will retire on pension in January 1st next, and a reorganization of the health insurance system is expected to follow. Sir Joseph Glynn was a solicitor in Tuam, County Galway, before his appointment to the office of chairman of the Commission in 1908. It was he who, with the other commissioners, organized the National Health Insurance Scheme for all Ireland, and later adapted it for the Irish Free State. Dr. Maguire, who had an extensive medical practice in Belfast before he was appointed medical commissioner, has been with the Commission since its establishment, and Mrs. Dickie was well known for her activities in social work before taking up her official duties.

CORRESPONDENCE

The Ross Institute

SIR,—In 1923 a movement was started to found an Institute to perpetuate for all time the name of Sir Ronald Ross, to carry on research work, and to stimulate malaria control measures in the Empire. The Ross Institute was officially opened in 1926 by H.R.H. the Prince of Wales, and Sir Ronald Ross was the director-in-chief until his death. What the Institute has already achieved is well known the world over, but if its work is to be continued more financial support must be forthcoming immediately. There is no endowment fund, and for two years contributions have been 25 per cent. below expenditure. This state of things cannot go on much longer. Surely an effort can be made to save the Institute and place it on a sound financial basis.—We are, etc.,

C. C. McLEOD,
Chairman.
QUEENBOROUGH,
Honorary Treasurer.

Ross Institute, Putney Heath, S.W., Oct. 11th.

End-results of Tonsil and Adenoid Operations

SIR,—With reference to Dr. E. R. C. Walker's assertion (*Journal*, October 8th, p. 692) that tonsillectomy " does not with anything like gratifying regularity afford the protection against upper respiratory infections that at one time it was expected to do," a long practical experience of this operation and its end-results has convinced me that in the majority of, if not in all, such cases the continued respiratory weakness is due to the coincident manifest or (more often) latent chronic infection, on one or both sides, of the maxillary antrum, and often of the ethmoidal sinuses as well. Hence the advisability of giving a guarded prognosis unless the coexistence of sinus infection can be definitely excluded. Whilst the existence of obvious intranasal sepsis or expert radiography may help the laryngologist to arrive at a decision, this may be difficult or impossible *a priori*, and a correct diagnosis may only be arrived at by inference or in retrospect. I am therefore totally unable to agree with Dr. Walker's submission that " the onus of decision [that is, *re* the removal of tonsils and adenoids] should be on the paediatric physician, and not on the aural surgeon."—I am, etc.,

J. B. HORGAN.

Cork, Oct. 10th.

Rheumatic Fever and the Tropics

SIR,—While, as Dr. Tertius Clarke states in your issue of October 1st, rheumatic fever may be rare or non-existent in tropical regions, experience in the Punjab has shown that it may be far from uncommon in sub-tropical areas. Clinical accounts of the disease as seen in the Mayo Hospital, Lahore, are given in papers published

by Yusuf and myself in the *Indian Journal of Medical Research*, October, 1930, and the *Indian Medical Gazette*, August, 1931. The articular lesions are usually subacute in nature, and by far the most frequent cardiac manifestation is stenosis of the mitral valve, either alone or associated with mitral or aortic regurgitation. I have never come across rheumatic chorea in the Punjab, nor have I had an opportunity of looking for Aschoff's bodies. Nevertheless the histories and clinical features of our cases undoubtedly indicate a rheumatic origin. Hookworms are present in some patients in small or moderate numbers, but in others no evidence of this infection can be found. Septic teeth and tonsils are common.

With regard to the suggested relation between sewers and the occurrence of rheumatic fever, I would point out that the majority of our patients come from villages where there are no sewers of any description, sanitation being of the most primitive type.—I am, etc.,

T. A. Hughes, M.D., M.R.C.P., I.M.S.,
Professor of Clinical Medicine, Medical
Marseilles, Oct. 13th. College, Lahore.

Maternal Mortality

Sir,—The subject of high maternal mortality has occupied the attention of the profession and the public for a long time, but the net result seems to resemble that of the "mountain in labour." Various explanations of, and suggestions for the lowering of, this high rate have been made in the *British Medical Journal* lately. Dame Janet Campbell considers that in Lancashire the high rate is due to difficult labour, and suggests the elimination of rickets. Dr. Jones blames the lack of education on the part of mothers, doctors, and midwives for the high rate in Wales. He thinks "the solution will be found in an all-round tightening up as well as strengthening of each link in the chain of obstetric supervision." Sir George Newman says that 40 per cent. of maternal deaths are due to errors of judgement, and that we require "sound midwifery."

Dr. Wentworth Taylor (October 8th) doubts whether, by the improvement of everyday practical obstetrics alone the actual mortality can be much changed, though, with a public demand for it, the results can be immeasurably improved. He suggests increased hospital accommodation and the training of practitioners so that they can recognize cases which can only be dealt with by a "proved" specialist. Dr. Taylor has evidently no idea of the amount of "sound midwifery" done by general practitioners throughout the country. Probably he sees some of their failures in hospital, but of those who almost never have to send cases into hospital he knows nothing. General practitioners have little time for writing to journals or publishing statistics. As I have been qualified forty-five years I may be excused for furnishing some statistics.

In sixteen years, between 1894 and 1910, I attended on an average four confinements per week in an East End district of Glasgow, where rickets was so prevalent that the first thing a stranger observed was the large number of bow-legged and knock-kneed people about. In all I attended over 3,000 cases, and the maternal mortality was two. One was a case of septicaemia and the other a case of anencephalic monstrosity. The latter was sent in to hospital, and died after four hours' manipulation. In addition I sent one case of failed forceps into hospital. I very seldom had a trained nurse or midwife, and had to depend on "handy-women" or neighbours for assistance. The scrubbing-up and disinfection had to be done by me. I did not wear gloves, masks, or gowns. I was my own anaesthetist, and gave chloroform in all forceps cases and in a large number of primiparae.

I knew of practitioners in Glasgow who had larger midwifery practices than I had, and I am sure that they could show as good results. I had two advantages. I was house-surgeon to Sir Hector Cameron in 1888, and outdoor house-surgeon to the Glasgow Maternity Hospital in 1890, where I had the same experience as Dr. T. O. Williams—namely, that the maternal mortality was greater in the hospital than on the district. Sir G. Newman says we want "sound midwifery." We cannot have a sound structure without a sound foundation, and the foundation of midwifery is the teaching. I cannot see much difference in the teaching now from what it was in the 'eighties, except that a student has to attend twenty cases instead of six. Even with twenty he may never see forceps applied. What is lacking in the teaching of midwifery is post-graduate experience, either as house-surgeon or under a practitioner with a wide experience of midwifery.—I am, etc.,

Birmingham, Oct. 16th. Robert Anderson, M.D.

Local Inquiries into Maternal Deaths

Sir,—The final report of the Departmental Committee on Maternal Mortality and Morbidity refers to the pressure brought to bear on the Minister of Health with the object of making every maternal death a matter for a compulsory inquest, and with the idea that an inquest on every case "would enable culpability to be apportioned where it was due, and so would stimulate a better standard of midwifery practice and ante-natal care." The committee do not deny the implication; they simply point out that an inquest by a coroner would not serve the purpose, and they advise, therefore, that the Minister should take appropriate steps to encourage local authorities to continue inquiries into maternal deaths as part of the routine work of a public health department." Clearly it is intended that the local inquiries shall be a substitute for coroners' inquests. That this is the nature of the inquiries is shown by the fact that the interrogation of the relatives of the dead patient is made a definite part of the inquiry, and the space for "Comments by practitioner in charge of the case" is omitted from the new form. Further, the nature of the inquiry is indicated by the purpose for which the information is used. The Departmental Committee informed the public that an examination of the cases showed that an error of judgement or lack of ante-natal care was the primary factor in 34 per cent. of the deaths. Now there can be no doubt that general practitioners, as a class, have been discredited by these figures, and there are only two possibilities: either the information was obtained by a form of inquest, or there was an obvious breach of confidence.

The inquiries are, to all intents and purposes, inquests. The demand for inquests was created by such statements as that of an ex-Lord Chancellor, who said (as reported in the *Times*) that "our maternity mortality was a disgrace, the ratio, compared with that of Holland and Sweden, being something like 14 to 2. . . . The reasons for a high rate were ignorance and carelessness." The ex-Lord Chancellor could hardly have made a more damaging statement. Now it has been shown, of course, that the ratio is nothing in the least like 14 to 2; it has been shown that when comparable figures are taken our mortality rate is no higher than that of Denmark and Sweden, and it is very doubtful whether it is any higher than that of Holland. It was also shown that the foreign rates had not fallen any more than ours, and that, owing to absence of slums and so forth, the foreign

doctors work at a great advantage. It was shown, in fact, that there was not the flimsiest foundation for any demand for inquests in any form. Any demand for inquests which is based on the findings of the committee is obviously ill founded. In the first place, we have no means of knowing to what extent errors of judgement and lack of care are factors in other deaths ; and, secondly, the evidence on which the committee base their beliefs is not available for examination.

If it is argued that the local inquiries are not inquests the fact remains that doctors are put more or less on their trial. This being so they are entitled to know, not only that their own statement of the case will be considered, but also that it will be judged by an authority whose mind is not already made up. An open mind is essential, and it is impossible to believe that anyone who signed the final report can have an open mind on the subject. Practitioners are bound to consider not only the reputation of their branch of the profession, but also their place in the future maternity service of the country. One example will make the point clear. The final report refers to a " plan for enlisting the help of the general practitioner for ante-natal examination," and goes on to say that " if such arrangements are made, it is important that steps should be taken to secure that the proposed examinations are not perfunctory." Practitioners are bound to ask whether plans for a maternity service are to be based on the assumption that their work is perfunctory compared with that of the public health department. Consideration of the attitude of the Ministry, as shown by the reports, suggests that in common fairness the matter should be dealt with by officials who were not members of the Departmental Committee.

It is more than doubtful whether private practice should be investigated by a public health department as a routine, but there are good reasons why local inquiries should be continued in a suitable form, at any rate for a time ; for one thing there are factors, obvious to general practitioners, which the committee overlooked. It is certain that the problems of maternal mortality can never be solved without the co-operation of the general practitioners, but co-operation involves conditions on both sides. It is difficult to believe that the conditions outlined in the Ministry of Health memorandum are the last word on that side ; it seems much more probable that the conditions on which practitioners can co-operate have never been appreciated by the Ministry. —I am, etc.,

Wetherby, Oct. 7th. R. L. KITCHING.

Maternal Morbidity

SIR,—I think we are inclined not to see the wood for the trees. We search for the exact brand of streptococcus causing puerperal septicaemia without asking what is wrong with a perfectly natural process that has turned into a disease.

The three things that really cause difficult childbirth are:

1. The shape of the pelvic brim, now oval but normally round, to fit the child's head.
2. Rigidity of pelvic joints.
3. Wrong position for delivery.

In all animals the brim of the pelvis in the female is the same shape as the part of the young which engages with it, and the two fit like a cup and ball. In the human race, among nomads and those leading an outdoor life, they still fit. Among the civilized the infant head remains the same—round in its halo measure—but the mother's pelvis has become oval or kidney-shaped. How this happens is easily seen when we recollect the cartilaginous ring with which infants are born. It is the most actively growing part of the whole body, and is therefore liable to rickets, while its shape is determined by the pull of the muscles attached to it while still soft. At 14 years of age it is fully formed for good or ill.

In outdoor dwellers there is no question whether the pelvic joints are " true " joints or not. They have to be used in running and climbing, and necessarily in the natural posture for defaecation and urination. Disuse makes them rigid, and the shape of the growing pelvis *depends on their free use from birth*.

Until the quarrel between doctors and midwives in mediaeval times no woman was ever confined on her back ; nor is she now in Asia, Africa, New Zealand, or among country people remote from help in the British Isles, such as Northern Scotland. Women in the above places, our own canal-boat people, and all gipsies manage things for themselves in the primitive posture, which is kneeling, crouching, or squatting. Where no closets are used and squatting is the position adopted for purposes of defaecation and urination, the maternal mortality rates are practically *nil*. This attitude, assumed several times a day from birth, keeps the pelvic joints supple, so that they can expand freely when the natural softening of the ligaments takes place before labour, and shapes the pelvis by equal traction in all directions. During parturition itself the natural position shortens labour, for it opens the pelvic joints to their fullest capacity—and how *can* infection arise when all discharges flow downwards and leave the body as soon as they can be got rid of?

Do not these three points explain everything?—especially the easiness of childbirth among all those who live natural lives, the absence of feeble-minded in such communities, and the equality of the sexes as regards numbers because with us the males who have the largest heads are killed at birth?—I am, etc.,

London, W., Oct. 13th. KATHLEEN VAUGHAN.

Fashion in Psychiatric Theory

SIR,—The annual report of the Board of Control mentions some hundred pieces of research of which not one represents an induction from the actual behaviour and history of the patient. The only work that could be called psychological consists in the application of certain laboratory tests for the estimation of certain factors concerned in " ability." This avows that: " The final aim, of course, is to bring objective methods into psychiatry in place of highly subjective methods at present extant." How such a statement is to be reconciled with the exclusively physiological method of the researches presented in the same report it is impossible to imagine.

The one " psychological " study mentioned by the Board of Control aims, then, to render possible an approach to the patient which will allow the physician to ignore his history and personality, his family, social, and economic problems, and all the circumstances which demand his segregation. It aims to substitute for these data (which require subjective assessment) a formula expressing the patient's reactions, not to real life and its biological interests, but to a number of laboratory tests of a highly abstract and artificial nature.

Mention is made, however, of a case where a functional interpretation had reluctantly to be accepted and a " lesion " theory abandoned. The functional explanation, however, is not given in the report, while the discarded

organic explanation is indicated. The patient, *inter alia*, hung pictures upside down and reversed the letters in words (pseudo-mirror writing). This " led one to think that these symptoms might be the sequelae to an organic lesion, causing the normal inversion of objects on the retina to be disturbed." This, of course, could only be brought about by the interpolation of other lenses in the optical system, thus producing an erect image ; but even if such a thing did happen as a result of " some lesion " it would not explain true or false mirror-writing where no inversion of image occurs. The fact that words were treated as wholes and presented in their right sequence (mirror-writing transposes the line as a whole) was pathognomonic of a functional condition, and should have excluded wild " organic " conjectures, even had the absence of incoordination not done so. Psychiatry will apparently entertain any absurdity provided it is " objective."

The craze for objectivity has led to the monopolizing of the resources (for research) of the Mental Hospital Service, in the study of the *organic* aspects or concomitants of mental disease, although the Maudsley report indicates that not one-fifth of all admissions can be regarded as organic in origin, and that these cases are the least hopeful therapeutically. The prevailing direction of research is therefore indefensible from the social and economic point of view. Scientifically it is equally deplorable ; a succession of blind shots with remedies and tests that have been devised in other spheres, applied largely without reference to the facts of the individual case (behaviour, symptoms, history, situation, etc.). But it has a worse aspect still. It encourages the " flight from the patient "—making the laboratory, and not the ward, the centre of interest When the patient is treated as a " case " and not as a fellow-being in trouble, his sufferings automatically cease to concern the physician ; indeed, this emotional defence and " hurry " are the main reasons for the depersonalization of the relation of the physician to the patient. Its consequences do not require to be mentioned.—I am, etc.,

London, W.1, Oct. 16th. IAN D. SUTTIE.

Blood Transfusion

SIR,—As the result of numerous discussions on blood transfusion which have appeared lately in the *Journal* I feel it is not out of place if I quote Lord Moynihan (*Abdominal Operations*, vol. i).

" The vein of the donor which is usually chosen is that which stands out most distinctly at the elbow after a bandage has been applied to the upper arm. . . . In the case of a man a metal needle of large bore is plunged into the vein ; when a woman is acting as donor a small incision has usually to be made under local anaesthesia. . . . The jar containing the citrated blood is then carried to the patient's room. A needle or cannula, as circumstances require, is inserted into a suitable vein of the recipient and the blood is allowed to run in through a sterilized funnel and rubber tube, such as is used for the ordinary intravenous saline injection. . . . Such is the technique ; the advantages it has over many other methods are: (1) Simplicity—no special apparatus is required, and though the assistance of a nurse is desirable it is not necessary. (2) Accuracy—the whole operation is conducted without haste, and in a long series of cases there has never been an accident caused by the clotting of blood. (3) Efficiency.

I have used this method over and over again, and can say that it is simple, accurate, and efficient. French's needles I have found very disappointing ; I have now given them up. A large-bore serum needle answers the purpose very well.—I am, etc.,

London, W.1, Oct. 17th. MAURICE LEE.

Obituary

ATWOOD THORNE, M.B.,

Hon. Colonel R.A.M.C.(T.)

Past-President, Metropolitan Counties Branch

We announce with regret the death of Mr. Atwood Thorne at Caerleon, Monmouthshire, on October 6th, at the age of 65. He received his medical education at St. Mary's Hospital, obtaining the M.R.C.S. and L.R.C.P. in 1892, and graduating M.B.Lond. four years later. He held the appointments there of house-surgeon, obstetric officer, and clinical assistant in the throat department ; these were succeeded by a time of active specialization in throat work and his election as surgeon to the London Throat Hospital. He was a past-president of the British Laryngological, Rhinological, and Otological Association, and subsequently secretary of the Laryngological Section, and member of the Council of the Royal Society of Medicine.

From his youth he was interested in the Volunteer movement, and joined the Cinque Ports Rifle Volunteers at the earliest possible age, receiving the commissions later of captain and major. He was awarded the V.D. when quite a junior. As surgeon captain C.I.V. he served in the South African war in 1900, being mentioned in dispatches, and receiving the Queen's medal with three clasps. In the last war he first commanded the 4th London General Hospital, and was later stationed at Chelsea Hospital, where he trained many sanitary companies. He was appointed honorary colonel R.A.M.C.(T.), 47th (London) Division, and received the Territorial Decoration.

With his military experience, and his continued interest in the British Medical Association, Colonel Thorne was naturally elected a member of the special committee which was appointed in 1906 by the Council to consider the reorganization of the Volunteer Medical Service. He was secretary of the Dinner Committee at the London Meeting of the Association in 1910 ; vice-president of the Section of Laryngology, Otology, and Rhinology at the Birmingham Meeting in 1911 ; treasurer of the Metropolitan Counties Branch in 1914–15 ; and president in 1917–18. Unlike his predecessors and successors, he did not deliver a set speech when inducted into the presidential chair, but gave a very topical and instructive address in the old Council Room in the Strand on the medical administration of modern armies. With his intimate knowledge of the changes initiated during and after the South African war, and his close observation of the improvements effected in military surgery in the subsequent years, he was able to appreciate more than many the swift advances made during the last war, and to visualize the new developments to which they were leading. Atwood Thorne's ready sympathy and generosity to those who needed help was as characteristic of him as his love of children.

With his retirement came opportunities to concentrate on his many interests. He devoted himself to the collection of pink lustre pottery, and in 1926 wrote a book on the subject, which was reviewed in the *British Medical Journal* of that year. He had entered the Cutlers' Company on coming of age, served on the Livery and the Court, and was elected Master for two years in succession. He made a tour of Roman England in 1927, and decided to settle in Caerleon, where he watched the gradual bringing to light during the last few years of the Roman camp, part of it being found in his own meadow in 1929. His sister, Miss May Thorne, M.D., was formerly an active worker on behalf of the British Medical Association.

THE LATE DR. FLORENCE STONEY

Dr. S. Watson Smith, chairman, Bournemouth Division, British Medical Association, sends the following appreciation of Dr. Florence Stoney, of whom an obituary notice appeared in our last issue.

Dr. Stoney was a radiologist to the Royal Victoria and West Hants Hospital here since the war. After long years of hard work in London and the excessive strain of war work abroad and at home she came to Bournemouth, where she carried on her excellent work in a quiet and efficient way. It is now notorious that the pioneers in *x*-ray work and those exposed unduly to unprotected rays usually die very painful deaths, and Dr. Stoney was no exception: she suffered greatly and bravely, and she knew quite well what would be the manner of her death. One regrets a little that after such brilliant war work Dr. Stoney was not honoured more; but then she was one of the quiet, steady workers in our profession who go so often unsung. Yet she worked for the love of her profession and of her patients, and asked no honour and no thanks. She was a pioneer in radiology, and a great woman doctor.

[The photograph reproduced is by Elliott and Fry, Ltd.]

The following well-known foreign medical men have recently died: Dr. Oskar Föderl, an eminent surgeon of Vienna, aged 67; Professor Alexander v. Rothe, formerly director of the surgical department of the Municipal Hospital, Berlin-Wilmersdorf; Dr. Paul Charmeil, formerly director of the dermatological clinic at Lille; Dr. Alfred Louis Ricard, surgeon to the Paris hospitals and honorary editor of the *Gazette des Hôpitaux*; Dr. Arcadius Pulawski, formerly editor of the Polish medical journal, *Gazeta Lekarska*; and Professor Felix Putzeys, founder of the Institute of Hygiene at Liége and Grand Officer of the Order of Leopold, aged 85.

The Services

DEATHS IN THE SERVICES

Colonel Frederick Fitzgerald Carroll, D.S.O., R.A.M.C. (ret.), died of pneumonia in London on October 5th, aged 57. He was born on November 27th, 1874, at Castledermot, Kildare, the son of Frederick Maxwell Carroll, Esq., of Moone Abbey, Kildare, and was educated at Trinity College Dublin, where he graduated as M.B., Ch.B., and B.A.O. in 1897, subsequently studying at Bonn and Vienna as holder of the Surgical Travelling Scholarship. He entered the R.A.M.C. as surgeon lieutenant on January 29th, 1898, one of the last batch appointed with the compound titles, became lieutenant-colonel in the long war promotion list of March 1st, 1915, was promoted to colonel on March 23rd, 1922, and retired on March 28th, 1926. He was seconded for service with the Egyptian Army from March 19th, 1907, to March 18th, 1920. He served in the operations in the Aden hinterland in 1903–4; in operations in the Atwot region of the Sudan in 1910, receiving the Egyptian medal with a clasp, and the fourth class of the Osmanieh; and in the Sudan operations in 1914, in the Nuba Mountains and at Manelah Sabai, when he was mentioned in dispatches in the *London Gazette* of October 25th, 1916, and received the medal with a clasp, the D.S.O., and the third class of the Order of the Nile. From 1923 to 1925 he served as an A.D.M.S. in the Northern Command in India. In 1918 he married Evelyn, daughter of the late Colonel Sir Edgar Bernard.

Medical Notes in Parliament

[From our Parliamentary Correspondent]

Parliament reassembled on October 18th. In the House of Commons discussion commenced upon the Ottawa agreements for the development of Empire trade, and Mr. Chamberlain presented resolutions to authorize certain new duties on imports to the United Kingdom.

A meeting of the Parliamentary Medical Committee was arranged for October 20th.

Universities and Colleges

VICTORIA UNIVERSITY OF MANCHESTER

The following candidates have been approved at the examination indicated:

Diploma in Public Health.—(*Part II*): Charlotte E. Forsyth, V. A. Newton.

UNIVERSITY OF DUBLIN

At the autumn commencements, held in Trinity College in Michaelmas Term, the following degrees were conferred:

M.D.—T. F. M. Woods, W. E. Hutchinson (*in absentia*).

School of Physic, Trinity College

The following candidates have been approved at the examinations indicated:

Final Medical Examination.—Part I (Old Regulations), *Materia Medica and Therapeutics, Medical Jurisprudence and Hygiene, Pathology and Bacteriology*: H. L. Connor, C. O. Greer, B. E. W. Aldwell, P. St. G. Robinson. (New Regulations), *Materia Medica and Therapeutics, Pathology and Bacteriology*: Marie J. S. O'Toole (passed on high marks), W. G. B. Halliden, A. F. J. Delany, J. F. Harbinson, A. E. Fannin, A. R. S. Jessop, R. C. Tyner, H. M. Glover, Doris E. Morton, D. J. O'Shaughnessy.

Diploma in Gynaecology and Obstetrics.—J. Borg, A. El Sayed El Khishin.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

A quarterly Council meeting was held on October 13th, the President, Sir Holburt Waring, being in the chair.

Sir Henry S. Wellcome, LL.D., F.S.A., was introduced, and admitted an Honorary Fellow of the College. Mr. Herbert Alstead was introduced, and signed the Roll of MacLoghlin Scholars. The secretary reported the death, on September 14th, of Sir James Charters Symonds, past Vice-President and member of the Council, and a vote of condolence was passed by the Council.

Diplomas of Fellowship were granted to Frederick Langley and to William E. A. Hughes-Jones. The diploma of Membership was granted to Herbert F. Moseley.

The treasurers reported that Sir Buckston Browne had made further grants of £9,139 10s. 4d., and in pursuance of his promise had now raised the amount of his gift for the Research Farm to £100,000. The Council expressed sincere appreciation of all that Sir Buckston Browne is doing to promote surgical biological research, and conveyed to him grateful thanks for his great liberality.

Museum Demonstrations

The three museum demonstrations by Sir Arthur Keith, arranged for Fridays, October 21st and 28th, and November 4th, have been unavoidably postponed.

ROYAL COLLEGE OF SURGEONS IN IRELAND

The following candidates have been approved at the examinations indicated:

Primary Fellowship Examination.—J. J. Fitzsimons, Margaret D. Gregg, E. A. McManus, H. D. O'Brien.

Final Fellowship Examination.—J. H. Coolican, M. A. W. Roberts.

CONJOINT BOARD IN IRELAND

The following candidates have been approved at the examinations indicated:

Final Professional Examination.—K. O'M. Barrett, F. R. Duggan, J. D. McClelland, Sheila E. Macdonald, F. E. McLaughlin, M. F. MacNamara, R. A. M. Montgomery, J. Murphy, P. D. O'Rourke, J. Tierney, G. A. R. Warren.

D.P.H.—T. V. Fitzpatrick.

UNIVERSITY COLLEGE, CORK

The diploma in psychological medicine has been awarded to Hegarty Denis, M.B.

Medical News

A meeting of the Medico-Legal Society will be held at 11, Chandos Street, W.1, on Thursday, October 27th, at 8.30 p.m. Sir John Collie will read a paper on "Fraud in medico-legal practice." The annual dinner of the society will take place at the Holborn Restaurant on Friday, December 9th, at 7.15 p.m., when the president, Lord Riddell, will be in the chair.

The syllabus of meetings of the Torquay and District Medical Society for 1932–3 has been issued. At the first meeting, on October 20th, Dr. Leonard Findlay read a paper on acidosis and alkalosis. A clinical meeting will take place at the Torbay Hospital on November 3rd, and on November 17th Dr. Cameron Davidson will give his presidential address on some theories of the causation of death. At the meeting on December 15th a discussion on the treatment of chronic rheumatism will take place. Ordinary as well as clinical meetings will continue to be held until June 1st.

The World League for Sexual Reform has arranged to hold a meeting at the London School of Hygiene and Tropical Hygiene at 8 p.m. on Thursday, November 3rd, to discuss the present state of the abortion laws in this country. Any medical man or woman interested may obtain full information by writing to the secretary, 127, Harley Street, W.1, enclosing a stamped addressed envelope for a reply.

At the meeting of the Royal Sanitary Institute at Durham on Friday, November 4th, a discussion on "Infectious diseases hospitals—modern ideas on construction and administration" will be opened by Dr. J. A. Charles, deputy M.O.H., Newcastle-upon-Tyne.

A meeting of the Mental After Care Association will be held at Springfield Mental Hospital, Beechcroft Road, Upper Tooting, on Tuesday, October 25th, at 3 p.m., with the president, Lord Wakefield, in the chair. The speakers include the Dean of Westminster, Miss Ruth Darwin, Mr. E. J. Sainsbury, and Mr. C. L. de Salis.

The second of the series of lectures on renal disease arranged by the Fellowship of Medicine will be given at the Medical Society of London, 11, Chandos Street, W., on October 25th at 4 p.m., when Mr. Everidge will discuss surgical aspects of haematuria. A week-end maternity course will take place at the City of London Maternity Hospital on October 29th and 30th. The first of a series of three demonstrations on clinical pathology, specially suitable for M.R.C.P. candidates, will be given by Dr. Knyvett Gordon at 10, Bedford Square, W.C., on October 26th at 8.30 p.m. From October 31st to November 19th an afternoon course in ophthalmology will be given at the Royal Westminster Ophthalmic Hospital. A course in neurology will take place at the West End Hospital for Nervous Diseases, daily at 5 p.m. from October 21st to November 26th. Other courses during November are: medicine, surgery, and gynaecology, at the Royal Waterloo Hospital, November 7th to 26th (afternoons and some mornings); diseases of the chest, at the Victoria Park Chest Hospital, November 14th to 26th (all day); venereal diseases, at the Lock Hospital, November 14th to December 10th (afternoons and evenings).

A course of lecture-discussions on mental defectiveness as a medico-sociological problem will be opened at the Royal Institute of Public Health, Queen Square, W.C., on Thursday, October 27th, by Professor R. J. A. Berry, chairman of the Mental Deficiency Committee of the British Medical Association, who will deal with the medical and social considerations of the subject. The chair will be taken by Mr. C. J. Bond, consulting surgeon to the Leicester Royal Infirmary, at 4 p.m. The course will be continued on succeeding Thursdays until December 1st.

Part I of the post-graduate courses for ship surgeons, arranged by the Seamen's Hospital Society, will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., from November 14th to December 2nd. The course will include lectures and demonstrations on water, food, the construction and sanitation of ships, infectious diseases, and port sanitary work.

The annual meeting of the Manitoba Medical Association, held at Winnipeg last month under the presidency of Dr. Ross Mitchell, was highly successful. The papers were of a high standard, and the number of members registered was the largest on record. The proceedings lasted three days, ending with the annual dinner and dance at the Royal Alexandra Hotel.

An extra-metropolitan dinner of the University of London Medical Graduates Society was held on October 13th at the Grand Hotel, Brighton. The president, Lady Barrett, C.H., reminded the members and their guests that the society was still very young, only four years' old, but was growing sturdier every year. It was a frivolous society, but it provided a common meeting ground, and formed a social link between medical graduates of the university belonging to different medical schools throughout the country. The society was developing a corporate spirit among the graduates of the Medical Faculty, which the new university building, when erected, should do so much to promote. Mr. McAdam Eccles announced that the membership of the society had now reached 500, and included a recent influx of graduates practising over-seas with whom he had been in touch during the Centenary Meeting of the British Medical Association.

The quarterly meeting of the court of directors of the Society for Relief of Widows and Orphans of Medical Men was held at 11, Chandos Street, on October 12th, with the president, Mr. V. Warren Low, in the chair. The deaths of three members were reported, also the death of one of the widows, who had been in receipt of grants since 1918; her late husband had paid in subscriptions £52 10s., the maximum amount that any member pays; his widow received a total sum in grants of £1,100. Three new members were elected. Three widows applied for relief, and were each granted £50 per annum from the ordinary funds, two, being over 65 years of age, £25 per annum from the Brickwell Fund each, and the third, being under 65, a grant of £10 per annum from the same fund. A total sum of £176 15s. was voted as special grants to widows to enable them to continue with the education of their children, who had reached the age of 16, at which age the ordinary grants cease. It was decided to make a Christmas present of £15 to each widow over 75, £10 to each widow under that age, and £10 to each orphan; a sum of £640 was voted for this purpose. Membership of the society is open to any registered medical practitioner who, at the time of his election, is resident within a twenty-mile radius of Charing Cross. The annual subscription is small compared with the benefits that may be received; there are special terms for life membership. Full particulars and application forms for membership may be obtained from the secretary, 11, Chandos Street, Cavendish Square, W.1.

At the session of the Académie de Médicine on October 4th, Dr. Manchoux delivered an address on Sir Ronald Ross, who was a foreign member of the Académie.

Professor Martini of Berlin has been appointed professor of internal medicine at Bonn, and Professor Bessau of Leipzig professor of children's diseases at Berlin in succession to Professor Czerny. Professor Arthur Schlossmann retired from the chair of children's diseases at the Düsseldorf Academy of Medicine on April 1st, and has since died.

The University of Oslo has received a gift of 20,000 kronen from a Norwegian chocolate factory for the foundation of a chair of the physiology of nutrition.

The French Academy has recently awarded its triennial Capuran prize for the best lyrical or dramatic work to Dr. J. Giuliani, alias Germain Trezel, for his play *La Tunique de Nessus*.

There has recently been an increase in the incidence of poliomyelitis in various parts of Germany. Fifty cases with four deaths have occurred in the third quarter, as compared with twelve cases in the first quarter.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

The **TELEPHONE NUMBERS** of the British Medical Association and the *British Medical Journal* are MUSEUM 9861, 9862, 9863, and 9864 (internal exchange, four lines).

The **TELEGRAPHIC ADDRESSES** are:
EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*
FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*
MEDICAL SECRETARY, *Medisecra Westcent, London.*

The address of the Irish Office of the British Medical Association is 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 62550 Dublin), and of the Scottish Office, 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh).

QUERIES AND ANSWERS

Bowel Control after Colostomy

"B." writes, in answer to the query in the *Journal* of October 8th: I have looked after six cases in the last few years, and thought the treatment employed might be of use to others. At the same time daily (8 to 8.30 a.m.) wash out the colostomy with two to six pints of warm water. Do this for a fortnight, and give no aperients at all. Then, for one week, wash out on alternate days at the same hours, unless there is an action without it. Then stop all wash-outs. If twenty-four hours pass without an action, or there appears to be any constipation, give one or two drachms of liquid paraffin. A small double layer of gauze and a sheet of cellulose tissue make the safest dressing; a large kidney dish receives the action. Give ordinary diet, but avoid curries and highly spiced dishes, and anything that by trial is found to cause too loose an action.

Dr. L. DULAKE (Reigate, Surrey) writes: I have a patient who has had a colostomy for two years, and she tells me this is how she controls it: "I never take an aperient of any kind. When I first had it I got up at 7.30 and took a plain hot water wash-out, as hot as I could bear on the back of my hand, using a rectal catheter, and massaging the stomach well. Once a week, at about 9 o'clock at night, I had an enema of four ounces of olive oil, two teaspoonfuls of oil of turpentine, soft soap about the size of a walnut, and made up to a pint with hot water. I went to bed after this. After a year I found I could take the olive oil enema in the morning without any inconvenience. Then taking that once a week was not quite enough, so some mornings I added a little soft soap to the water. Now, after two years, I use the olive oil and turpentine one morning, the next morning plain water, and the next five add soft soap to the water. I never use more than a pint. I get up at 7.30, and am downstairs by 8.30. At night I take the juice of a lemon without sugar. I wear a small square of gauze, jaconet, and cotton-wool, and a plain narrow elastic belt in the daytime. At night I wear nothing over the colostomy at all." On this regime she never leaks, and has no trouble with flatus. At one time for flatus she used to eat charcoal biscuits. She never diets.

Softening the Beard

"N. J. A." writes: The one point which has been overlooked in the various letters of advice on this subject is the use of very hot water—that is, hot enough to sting the skin and too hot to bear the hand in for longer than a second or two. If "W. B. D." will soften the beard on one side of the face with such water (130° F. at least), using a large shaving brush or a small sponge, and on the other side use the usual warm water, then lathering and shaving in the ordinary way, the contrast will be very apparent.

Income Tax

Car Replacement: Private Use

"F. H." explains that his partner and himself have replaced their cars and that the inspector of taxes refuses to allow the whole of the cost of replacement on the ground that it is partly attributable to private use.

*** Apparently there is a certain amount of private use, and to the extent to which the replacement is necessitated or hastened by such use the cost is not an admissible income tax deduction. In dealing with such questions the ratio of private to professional use is usually, if not invariably, taken as the basis of division of expenses, and we are of opinion that our correspondent has no adequate answer to the inspector's contention.

Replacement of Car: First Year of Practice

"O. A." bought a practice from June 30th, 1931, and arranged with the local inspector of taxes that his liability for the first year should be computed on the basis of his cash profit. In February he replaced his car at a net cost of £145 (£185 – £40). His old car had not been required for professional use prior to June, 1931. Can he claim the cost of the replacement?

*** The point does not seem to be covered by authority, but in our opinion the inspector would have good grounds for objecting to the claim, seeing that the old car was not worn out in professional use, and that if "O. A." had not owned it the purchase of the new car would clearly have been capital outlay. He is fortunate to be receiving the advantage of the cash basis for his first year, and it would be tempting fortune to press the replacement claim. Also, if that were to be admitted, it would bar the depreciation claim for 1931–2 and 1932–3. We advise "O. A.," therefore, not to claim the renewal, but to claim depreciation as follows:

	£
July 1st, 1931, to April 5th, 1932, £40 at 20 per cent. for seven months	5
Plus £185 at 20 per cent. for two months ...	6
	£11
Year to April 5th, 1933 (£185 – £6 =) £179 at 20 per cent.	£36

Liability of Visitor to England

"W. B." left India on May 3rd and arrived in the United Kingdom on July 24th. The stay here has already been broken by a fortnight abroad. When does he become liable to pay income tax in this country?

*** We assume that "W. B." has his ordinary residence abroad and has not been maintaining another residence here—for example, for a wife and family. If he spends six months of the financial year in the United Kingdom he will become liable as for that year in respect of all income received by him or on his behalf in this country. As the present year ends on April 5th, 1933, he will become liable as a British resident for 1932–3 unless he spends another fifty-eight days outside the United Kingdom before April 5th, 1933.

Travelling Expenses of Locumtenent

"W. D." inquires whether the inspector of taxes is correct in holding that a locumtenent cannot deduct the expense of travelling to his various appointments from the amount of fees received.

*** A locumtenent's fees are technically the profits of employment, and it is settled law that the expenses of travelling to the place of work are not incurred in carrying out the duties, and therefore are not deductible. If "W. D." has held only a few appointments as locumtenent, and those for substantial periods, the inspector is probably correct in regarding each engagement as a separate employment assessable under Schedule E, and accordingly refusing to deduct the expenses. But we have always regarded the earnings of a medical man in regular locumtenent work as being not so much the profits of employment as the earnings of a profession—carried on in a particular way—and assessable under "Schedule D, Case II." On that basis the travelling expenses are allowable. If the inspector with whom "W. D." is dealing is unwilling to look at the matter in that way an appeal might very well succeed, or "W. D." might submit the point to the authorities at Somerset House, giving the full facts and asking for their ruling.

Payment of Assistant

"D. W. Mc." inquires whether a principal contracting to pay an assistant £350 and to provide him with board and lodging at a cost of £100 a year would be worse off as regards income tax deduction than one paying £450 a year to the assistant.

*** No. In each case the principal is expending the same amount and is entitled to the same deduction. The difference in the two arrangements, however, would probably affect the assistant, as in the former case he would be liable to assessment on £350 only.

LETTERS, NOTES, ETC.

Treatment of Boils

Dr. H. L. McCormick (Glasgow) writes, with reference to Dr. Rupert Hallam's paper (October 8th): My experience is that the most satisfactory treatment for boils, recurring or non-recurring, is intramuscular injections of manganese butyrate. I have used this preparation for several years past with complete satisfaction. Moist dressings are unnecessary, dry dressings being quite sufficient—a time-saving matter for the busy general practitioner. A small incision meets the need for any surgical intervention. Collosol manganese is of much value in building up the patient's resistance to infection, but for immediate treatment the butyrate is the drug of choice. Vaccine therapy, actinotherapy, yeast, purgatives, etc., are more buckshot than medicine. Another method of prophylaxis which does not appear to have received the attention which it merits is Dr. Knott's thyro-manganese treatment. This is a very good and a very simple line of treatment, and should be more widely known.

Dr. J. T. Maclachlan (Dornoch) writes: The experience of any one doctor is necessarily very limited, but I should like to point out that quinine is a very efficient remedy for boils. But it must be given in adequate doses. I have found that 10 grains a day are required, given in 2-grain doses every two hours, or five doses a day. I tell my patients that in forty-eight hours no more boils will appear. I presume it acts as a germicide.

X-ray Therapy in Erysipelas

Dr. M. K. Sambasivan (Kunhakonam, S. India) describes the case of a man, aged 54 years, who was admitted to hospital for alveolar abscess. Four days after incision of the abscess and removal of two molar teeth, a rigor occurred and the temperature rose to 104° F. On the evening of the next day pain and swelling was present on the left side of the face; the temperature remained high. One day later an extension of the swelling towards the nose had occurred, a diagnosis of erysipelas was made, and the affected area was painted with tr. ferri perchlor., antiserum (20 c.cm.) being given (temperature 103°–104°). On the next day the right side of the face was affected: serum was again given. On the following day the whole face was involved, parotid and submaxillary glands being swollen and tender, and the temperature varying between 103° and 105°. Serum administration was repeated. A small dose of *x* rays, given next day to the face, was followed in twenty-four hours by a drop in the temperature to 99°, a reduction of pain and swelling, and a general improvement. The patient was discharged cured in less than a week.

The Female Figure: Ancient and Modern

"Another M.D." writes: The European stronghold of Astarte was Malta, and a short stay on the island shows that she is still adored there. It also happens to be a place where ecclesiastical pressure concerning birth control is both strong and effective—a highly reprehensible state of affairs if its maternal mortality rate were equal to that of, say, Barnsley. Actually, however, according to their public health reports, the maternal mortality rate is a small fraction of 1 per cent., a result which indicates either that your correspondent "M.D." (September 24th, p. 616) is correct, or else that Malta is capable of teaching England something about the conduct of confinements.

Differential Count of Leucocytes

Dr. Frederick Cock (Weston-super-Mare) writes: The note of Dr. A. Fraser (Glasgow) under the above heading in the *British Medical Journal* of September 24th emphasizes the fact that the percentage estimation of the white blood cells is tedious, and takes considerable time. This is, of course, chiefly due to the number of fields that have to be examined before a total of 200 or 300 leucocytes is found for the estimation. If a film is made according to the "drop smear" method I described in the *British Medical Journal* of February 25th, 1928 (p. 306), it is remarkable how quickly a count can be made. Instead of a few leucocytes per field fifteen to thirty is the average, and in some fields as many as sixty. The difference between a count made by this method and one made from an ordinary blood film is noted in the article referred to.

Disruption of the Pelvis

Dr. Charles E. Dennis (Melbourne) writes: The report in the *Journal* of June 11th suggests to me that the following is also worth putting on record as a case of complete disruption of the pelvis without any pelvic fracture. On August 25th, 1926, I was asked by Mr. Fay Maclure, F.R.C.S., to make a bedside *x*-ray examination of a lady who had had a bad fall while hunting and sustained a pelvic injury. Her horse had fallen at a jump, pinning her under it in a sitting posture, with one side of her pelvis against a stone. The radiograph showed an upward displacement of the whole of one side of the pelvis, dislocation occurring at the pubic symphysis and sacro-iliac joint. The only fracture present was that of the fifth lumbar transverse process, which had been displaced by the ilium. Treatment was by extension, but difficulty was experienced in maintaining reduction. Eventually she made a good recovery, and I am informed she was able to continue hunting.

Medical Golf

The autumn meeting of the Shropshire Medical Golf Association was held at Church Stretton on Sunday, October 2nd. In spite of a gale on the Stretton Hills some very good scores were returned. The captain's prize, presented by Dr. F. A. Anderson (Shrewsbury), was won by Dr. K. M. Rodger, with 88−12=76 net. Other leading scores were: Mr. A. D. Haydon, 90−12=78; Dr. Fowell, 89−10=79; Dr. Beckett, 91−11=80. The foursomes competition was won by Dr. J. Lavelle and Dr. K. M. Rodger—all square, the runners-up being Mr. A. Lavelle and Dr. T. R. Elliott—5 down. Dr. A. C. Watkin was elected captain for the year 1932–3, and Dr. T. R. Elliott was re-elected honorary secretary. The spring meeting was fixed for the last Thursday in May at the Hawkstone Park Golf Club.

The Medical Golfing Society held its autumn meeting at Deal on October 8th and 9th, by invitation of the Royal Cinque Ports Golf Club. Over eighty competitors took part, and, in spite of very inclement weather, thoroughly enjoyed the splendid links. Their comforts were well attended to by Mr. Bernard Drew, the secretary, to whom the society owes many thanks. The dinner on Saturday was a very cheery affair, and the selling sweep, in Mr. Rowley Bristow's able hands, was a great success. The various competitions resulted as follows: Singles *v.* Bogey: First, A. Galletely; second, A. Rusack. Foursomes *v.* Bogey: First, A. Galletely and G. D. McGrath; second, Harold Chapple and W. Dale. Canny Ryall Cup: First, J. L. Livingstone, 74 net; second, G. D. McGrath, 75 net; third, J. Grace and W. Dale, 76 net. The thanks of the society are due to Mr. H. M. Creasy for the organization and conduct of the whole meeting and the selling sweep.

Thyroideum "B.P. 1932"

Messrs. Armour and Co., Ltd., write: There is a very considerable conflict of opinion regarding thyroid *B.P. 1932*. Certain hospitals have been offered *U.S.P.* 0.2 per cent. thyroid powder as being twice the strength of the new *B.P.*, and we have had several inquiries asking if it is satisfactory to break down, with equal parts of milk sugar, thyroid powder with an iodine content of 0.2 per cent. to produce the 1932 product. It must be borne in mind that thyroid *B.P. 1932*, although being standardized to 0.1 per cent. iodine in combination as thyroxine, actually contains more than 0.2 per cent. total iodine. An assay of a good grade thyroid will probably give a total iodine content of up to 0.3 per cent. Of this iodine content probably 10 per cent. will be inorganic iodine; of the remaining 90 per cent., thyroxine iodine varies from 30 to 60 per cent.; the remainder of the organic iodine is in the form of acid-soluble di-iodotyrosine, the latter being physiologically inert. Of the three iodines present in thyroid, therefore, only one—namely, acid insoluble thyroxine iodine—is recognized in the *B.P.* product, and it is on thyroxine iodine content solely that the *B.P. 1932* standardization is determined.

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 41, 42, 43, 47, and 48 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 44, 45, and 46.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 219.

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It has often been suggested that the heat process employed in powdering milk by the Roller Process must necessarily involve damage to the growth-promoting factors in milk.

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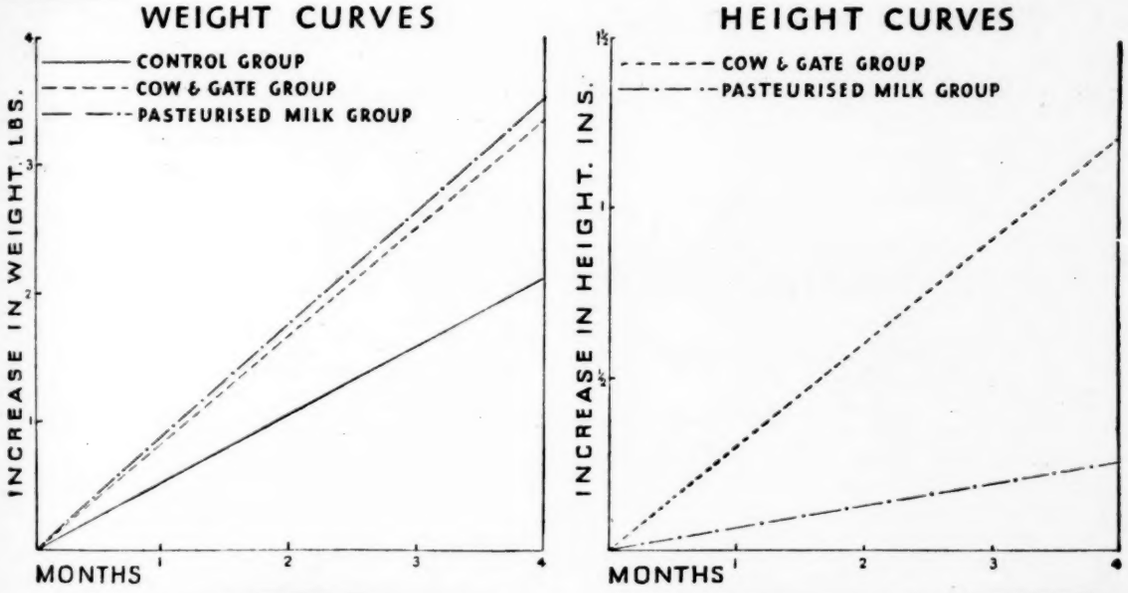

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